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THE CONTRIBUTION OF SURGERY TO MEDICAL PROGRESS*

J. Trueta, M.D. (Barcelona),
D.Sc. (Hon., Oxford), F.R.C.S. (Hon. [C.])

Oxford, Eng.

I MUST begin by apologizing for the pretentious title I have chosen for my address. I think that it may appear ostentatious to you, mainly because a subject of such interest will make my insignificance appear even greater in attempting to summarize in some 40 minutes a process which has taken many centuries to accomplish.

It is evident that some of the facts to which I shall refer here are so much public knowledge that at first sight it may appear better to omit them. But I shall need them as a background and for that reason I must refer to them even at the risk of appearing repetitive. The first of these known facts is that the history of mankind may be studied from its remote origins down to the present day by inquiring into the changes of medical thought and practice. In the slow process towards civilization, the desire to preserve life and suppress pain must have been two of the elementary stimuli pushing man from ignorance to science. All that was thought to have beneficial effects upon health and disease was not only accepted, but even revered as a God-sent present, and a garbled mixture of verbiage, of rites, and a few well recorded facts, constituted the sacerdotal medicine of the old days. Time and effort were needed to reach the stage when man could proclaim his ignorance without causing irreparable damage to his social position; in medicine this should have been even more difficult because the possessors of infallible wisdom had already constituted a profession. When, at last, the known number of facts, grown beyond the limits of official belief, was large enough, ancient medi-

cine faded away, not yet to give place to modern scientific study, but open the era of the medical system. Frequently the new data had been acquired by men free from the serfdom of traditional creeds, men, who in turn were the initiators of new beliefs. Thomas Huxley had rightly said that it is the customary fate of new truths to begin as heresies only to end as superstitions. In general, it might be said that the amount of truth inserted into each medical system was inversely proportional to the rigidity of the pseudo-scientific dogma.

As time passed the medical men ceased to be priests and their place was taken by philosophers. The great efforts of thinkers such as Roger Bacon to encourage less abstract reasoning and more accurate observations of facts by experimentation were of little avail. It was also in vain that Arnau de Vilanova bitterly complained that the medical teachers of the Sorbonne were "losing themselves in universals and ignoring particulars" while at the same time their unfounded therapeutical empiricisms were based, he said, "on particulars and ignored general principles". In an atmosphere such as this it is not surprising that the medical men of the time took no notice of the approved petition made by Ramon Lull to the General Council of the Church which met in Vienna of France in 1311 to plan a reform of the science of medicine by exalting experience and experiment at the expense of authority.

Medical schools had by then grown into university bodies, but at that time they were largely concerned with relating supposed effects to unknown causes. From this unreal world, surgeons were practically excluded. In the XIIIth century, surgery was separated from medicine and became a professional corporation. I am not sufficiently well acquainted with the successive steps that brought about the separation but it may be suspected that the exclusion was not unrelated to the hopelessly unphilosophical mind of the majority of surgeons, and also, perhaps, to the disrepute into

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which surgeons had fallen, a glimpse of which is given by XIIIth century William of Salicet who stated that, "a wise surgeon will refrain from stealing while he is actually in attendance of a patient". In the meantime, and for centuries to come, medical theory was based on the four humours and four temperaments which the Arabs brought with them to Europe as one of their legacies from ancient Greece.

The lack of university training, with its consequence the ignorance of Latin of many of the surgeons, contributed to place most of the exercise of the surgical art in the humble hands of barbers; the surgeons were called in Paris "gentlemen of the short robe" or gown, in contradistinction to the "long robe" used by the university *medicus* and a few privileged surgeons. A similar degrading process occurred among the London surgeons who were joined in a Fraternity of Surgeons at the first part of the XIVth century. That early separation between speculative medicine as taught in the medical schools and the empiric manual art of the barbers was probably mainly responsible for the centuries of scientific stagnation that characterized the medicine of the Middle Ages. It calls to mind the state of medical thought that Galen so vividly pictures in his *Treatise on Medical Experience* when the Dogmatist of Asclepiades' school fought the Empiricist of his time. But the latter had the support of such men as Galen himself or at least did not meet with their opposition. Until the study of anatomy by the dissection of human corpses dealt a fatal blow to professional authority, the dark era of medicine did not end. It is unnecessary to remark that dissection was a technique closer to the craft of surgeons than to the speculations of doctors. The early description of the pulmonary circulation by Servetus in 1546, of which we still have an account in the MSS now in the National Library of Paris, was the first great result of the new anatomical approach initiated by the dissections of Leonardo da Vinci, whose drawings and sketches are preserved in the Royal Library of Windsor Castle, and in the Ambrosian Library of Milan. Servetus had the opportunity of studying the components of at least part of the circulatory system in his dissections in Paris, where, together with the greatest of all the anatomists, Andreas Vesalius, he assisted Guntherius in his teaching of anatomy. It is

not by mere chance that the two first great surgeons in the modern sense—Ambroise Paré and Leonardo Botallo—appeared at that time.

The successive stages by which the Middle Ages' barber became the surgeon of contemporary times does not constitute the subject of this paper, but I would not be giving due credit to the rôle of evolution and to the permanence of ancestral characteristics in later products of biological development if I were not able to notice in today's medical and surgical approach to biology, peculiarities inherited from our respective ancestors, the gentlemen of the long, and the men of the short gown. Let me mention but two: as recently as the latter part of the XVIIIth Century we are told that in Prussia the prestige of the surgeons was still so low that flogging was administered to the surgeons of Frederic the Great when soldiers of his guard died of wounds—the higher the rank of the deceased the greater the number of strokes! The practice of this indignity has fortunately fallen into oblivion, but if the world has forgotten how we have been treated in bygone days, we surgeons still keep our memories fresh. This is the second peculiarity to which I have referred. I think it will not surprise anyone here when I say that these memories are nowhere more alive than in England. As early as 1308 the Barbers of London had formed themselves into a Guild; in 1540, by an Act of Parliament, they were united to the Fraternity of Surgeons and formed the United Company of Barbers and Surgeons. From the university medical schools came the would-be scientists with his title of Doctor. The surgeon was only a member of a professional Guild or City Company and was addressed like any other free citizen with the plain Mr. In 1859 in Scotland and in 1886 in England, medicine and surgery were re-united, ending the régime which had kept apart the two branches of medicine for at least seven centuries. But after living for less than a decade in England even I, who had reached the country very proud of my continental "Doctor's" degree, have ended by feeling uneasy when I am not addressed as "Mr". So strong is the attachment and fidelity to my professional past which I have regained in Britain from the example of my British surgical colleagues.

There are differences between physicians and surgeons which it would be wrong to deny, and

the maintenance, even now, of some characteristics of our different pasts, has been responsible for the belief that—as in the Middle Ages, if perhaps not so prominently—the scientific endeavours in medicine are the patrimony of doctors or physicians, whereas the rôle of the surgeon is still confined to the development of that manual dexterity, courage and quick reasoning, which have been attributes of the great surgeons of the past.

Allow me to express my conviction that the surgical contribution to the progress of medicine as a whole has not been sufficiently recognized. I must here ask your indulgence again for what I am going to say, as it may be difficult for me to keep an exact sense of proportion in speaking of something which forms, as surgery does, so great a part of my life.

We, as medical men, and even more our ancestors, have benefited from the creative ferment of the Renaissance, and it is widely recognized that the full contribution to the common progress, which the Renaissance started, was not achieved until John Hunter established his quarters in London in 1749. It is true that his brother William had already opened his private school of anatomy in London where, as he so delightfully advertised in 1746, "Gentlemen may have the opportunity of learning the art of dissection"; but it was John who, very proud of his "short gown", put his qualities as a surgeon to the service of the common good by initiating the era of animal research. His views on many subjects were widely discussed and their importance recognized, even if not always accepted, not only by surgeons, but also by founders of modern physiology like Magendie, the teacher of Claude Bernard, who, fifty years later opposed Hunter's views on the absorptive capacity of the lymphatic system. One of the greatest pleasures I owe to experimental work is that of having confirmed—like others have before me—that Hunter was right, whereas Magendie, who generalized from the results of a single type of experiment, was wrong. If in other respects Hunter's opinions have not lasted so long, it must be recognized that it was he who antedated Johannes Muller and Claude Bernard, the two pillars of modern scientific medicine. The French philosopher, Henry Bergson, is right when he says that scientific research is a dialogue between the human spirit and nature; and few had sus-

tained it so intensely and so long as John Hunter. Claude Bernard himself an exceptional observer, said that the experimental method judged on its own merits is nothing more than a way of reasoning, by the help of which we methodically submit our ideas to the experience of facts, and it is not too much to claim that it is from the surgical field that this light mainly emerges.

To my limited understanding these have been the two major contributions to the progress of medicine that came from the surgical art; on the one hand the lack of respect for traditional speculative abstraction which finally demolished systematic medicine; on the other hand the filling of the free spaces left by this purely destructive action by the findings which the new surgical method of questioning nature was supplying. The unorthodox approach, so dangerous when it is only destructive, has been a source of progress when associated with the introduction of new truths gathered by the method that Hunter created. Even at the second half of the last century when the greatest medical discovery of all times was made, it came from outside the purely medical field. Between Louis Pasteur the chemist and Joseph Lister, the surgeon, there was built the modern conception of infection and its treatment. That was over two centuries after the greatest of the medical scientists, William Harvey, had commented on the criticisms of his work on the circulation by saying that "the facts cognizable by the senses wait upon no opinions, and the works of Nature bow to no antiquity. . . . There are many things we admit to physiology, pathology and therapeutics, the causes of which are unknown to us: the causes of putrid fever . . . among the number."

Surgeons who preceded Lister benefited themselves from the study of human anatomy in the dissecting rooms, but of late we have learnt that the static anatomy of the cadaver is as distinct from the dynamic or functional anatomy of the living person as death is different from life. An example might help to convey my meaning to you: if we study in a cadaver of a young person the number, distribution, arrangement, collaterals and calibre of the arteries at the level of the elbow we are impressed by the number and importance of the vascular connections between the arm and

the forearm. Judging by the anatomy of the corpse the obstruction of any one of such arteries, even that of the brachial artery itself, would not cause irreparable damage: in particular, the three recurrent arteries and the profunda brachii, should, in theory, carry the blood which otherwise flows through the brachial artery: but, as is well known, this often does not happen. It is simply that in the living, the calibre of the vessels is very variable and often very different from that seen in the fixed and embalmed corpse and, depending on the degree of change, the result may be gangrene or Vilkman's ischæmic contracture. The surgeon is in a unique position to learn this variable anatomy of the living subject, what we today call functional anatomy. Experiments on laboratory animals serve to complement the observations made in the human, but never can take the place of the accurate observations that scientifically-minded surgeons may make in the course of operations.

We not infrequently think of experience as being the source of crude facts and of intelligence as being the faculty for handling these facts until, by their inter-relation, natural laws are discovered. This wrong conception is rejected by the Bernardian saying that no truth, philosophy or science would be possible on this false method of synthesis: that in fact a double independent contribution by the so-called *observers* and by *thinkers* to scientific progress is untrue. It is a misconception to believe that there is any scientific purpose in the piling up of data collected without a plan or purpose, with the idea that they may wait until the day when someone will come to extract the meaning from the amassed facts. A scientific observation can only be part of an attempt to answer a particular question, and for that reason research must have some purpose from its beginning or it will never have any; though its significance may change as new facts become known, a meaning is indispensable for any work from the start.

There is another element also responsible for the progress of medicine in the experimental field, namely the improvement of methods and means of investigation. It is unquestionable that medical research is the most complicated there is, because human life, either in health or disease, is integrated by innumerable factors each of a very distinct nature and each of which must be studied with techniques and

methods adapted to the type of research which is being performed. Bernard has expressed this view, writing that the future of experimental medicine depends upon the creation of a method of research which would be applicable with profit to the study of the normal and pathological phenomena of life. This method will probably not be found by surgeons and it is even unlikely that the surgical contribution in this particular technical sphere will ever be striking; but it is the surgeon who may use with the greatest profit methods and instruments evolved by highly specialized laboratory workers experimenting on animals, for investigations in man. The reverse may also lead to great results as may be seen in the use in animals of x-ray methods that have been developed along the line of clinical and therapeutic medicine, i.e., for use in man. The idea of obtaining information on the flow of blood in organs in varying circumstances, by using opaque substances injected into the blood stream, has not merited great attention so far, and in very few research centres has there been developed a section for x-ray investigation. But where x-rays have been used for animal research the information collected has been striking, as I have personally been able to witness in Oxford.

Apart from this technical side in the progress of experimental medicine which is open to all members of the medical profession, we surgeons are in the best position to increase the common knowledge by the two only reliable methods for scientific progress, *observation* and *experiment*. An accurate observer is he who applies methods of investigation, simple or complex, to the study of phenomena which he has not contributed to change: and we give the name of experimentalist to him who uses methods that alter the natural phenomena in any sense whatsoever. From the wise combination of both methods, accurate observation and repeated experimentation, is made our present advance towards a medicine based only on biological science. A good recent example of the part played by each of the two methods in medical progress may be found in the discovery and later the utilization of penicillin in therapeutics. As long ago as 1853 Louis Pasteur had found that a mould, *penicillium glaucum*, had the property of utilizing only that component of paratartaric acid which deviates the light to the right, the dextro-tartaric acid. A solution of paratartaric—of racemic acid—is

indifferent to the light, but when *penicillium glaucum* is left to act upon the solution, only the dextro-tartaric acid is metabolized and the light is then deviated to the left. This observation, it should be noted, was made even before bacteria had been discovered—the same genius was to make this step ten years later. Until 1929 no new observation had been made on this striking biological phenomena of metabolic selectivity, in spite of the frequency with which *penicillium glaucum*, the vulgar green mould, had been observed. But in 1929 Alexander Fleming was struck by a fact which must have been found by other people before him, the sterilization of staphylococcal colonies in a plate which had been contaminated by another mould—*penicillium notatum*. The importance in this case lies in the fact that Fleming made an observation which he recorded and in spite of not yielding immediate fruit, prepared the way for the great progress of recent times in the treatment of septic conditions. The old observation of Fleming served at the beginning of the latest war as the basis for the experimentation by Florey, Chain and their associates by which they achieved the isolation and stabilization of the active principle of *penicillium notatum*, penicillin. In this case the two parts, accurate observation and successful experimentation, were separated by a span of 10 years; in other subjects of research, observation and experiment go more nearly together, the one following the other so closely that it is not uncommon for both to be carried out by the same investigator. In this connection too, surgery has an advantage; it offers an ideal vantage point for judging not only the size and operability of malignant tumours or the possibility of amputating a leg or a stomach as in the surgery of the past, but even much more important than that, it offers us the opportunity of examining the quality and reactions of the human tissues; their blood and nerve supply; their lymphatic circulation, and, in some cases, the individual tendency to tissue regeneration, to scar formation, etc.

We may now consider what we have already obtained by using these methods of "natural experimentation" in examining and treating surgical infective complications, but before I expand on this subject I would like to stress my conviction that we owe the preservation of the rare fruits of experience to a firm attachment to traditional beliefs, for without this

fidelity to traditional thoughts, the few known truths which came down to us from ancient times could not have been saved from oblivion. Like the Devonian or Silurian clay which, with its amorphous structure and absence of life has preserved for us the remains of prehistoric organisms, even though in a fossil state, traditional immutable thought has also preserved in its intimacy the only valuable observations that primitive man had accomplished in the course of time.

It has happened with discoveries and innovations in every field of human activity that the creative effort by which man tries to widen the limits of his knowledge is opposed by a resistance related not only to the attachment to antique beliefs but even more to the importance of the new discoveries. The type of opposition by traditional thought passes through three different phases: at the beginning the truth of the innovation is rejected, later its importance is minimized, and ultimately its originality is denied. This is asserted by the great geographer Von Humboldt in his classic work on Columbus and the discovery of America. Applying this method to other discoveries, we may judge of the importance of new truths by the time taken by the elements in opposition in changing from one phase to the next. In the case of the Pasteur-Lister discovery we know that the resistance to accept the new truth was great (the first phase of the opposition); then, the second stage was reached and the importance of this discovery was minimized, if its veracity was not actually denied. The first period was very long indeed, but the second phase was in this case very much shorter and the third and last was practically non-existent, for it was extremely difficult for any opponent to find documental evidence of real predecessors of Pasteur and Lister. But, as has been stressed before, that which begins by being considered disruptive and dangerous not infrequently ends by being accepted, often with faith if not with superstition. As the new idea in Pasteur's discovery was that of the germ, once the partisans of the spontaneous generation theory had been disbanded, the whole interest of the fight between bacteria and the human organism was concentrated on the former and very little attention was paid to the latter. With all respect to my colleagues who may think otherwise, my surgical experience

has taught me that the study of the characteristics of any infection is not the exclusive duty of the bacteriologist. As the word bacteriologist implies, he cares mostly about the nature, type and characteristics of the attacking bacteria but does not take the same interest, so far, in the behaviour of the human tissues and fluids where the bacteria dwells. With the enormous progress of what may be called *in vitro* or laboratory bacteriology, bacteria are classified by their behaviour when cultured in an artificial media or at any rate in media separated from living animals; this is so far the only reliable method of studying bacterial characteristics. But what really would be of interest to both the patients and to us is to learn the properties of these bacteria, not when grown in artificial media but when tested against the fluids or cells of the patient the germ invades. A bacterium may be the same in two patients but the infection caused by it may be completely different in each, not only in seriousness but even in characteristics.

I mention all this as an indication of the excessive oblivion of the fact that we do not treat infections but patients. I venture to think that the latest war has contributed largely to an enhanced medical interest in the properties of the human medium in deciding the ultimate outcome of infections. In this war, as opposed to what had happened in all previous wars including that of 1914-18, the main surgical interest was not in bacteria but in the soil in which they might live. Instead of continuous attacks upon bacteria by means of anti-septics and the repeated counts of bacteria growths in the tissues by microscopic examinations to judge of the gravity of infections, the germs have been left this time to face tissues and fluids in their best possible conditions, not only by removing at any time all dead and devitalized fragments of tissues, but also by avoiding fluid retention and the dangers of too early movement. To that has been added, in the second part of the war, the systematic use of penicillin as a substance which adds its most beneficial power to the natural defence of the body without interfering with the normal metabolism of the tissue cells, properties not dissimilar to those possessed by the humours of immunized animals. By this double-sided approach to the problem of infection, by the removal of the seeds with antibiotics and

sulfonamides, on the one hand, and on the other, the making of the soil unsuitable for bacteria by appropriate surgical measures, the surgeon has contributed to the understanding of what I would like to call living human bacteriology.

Many of us are convinced that while a part is played by the intrinsic virulence of bacteria, the problem of infection and particularly that of chronic infection mainly depends on the local condition of the medium or tissues where the bacteria dwell. We surgeons also know that the condition of the tissues is gauged by that of its blood supply. Chronic suppuration in any part of the body means that there exists an area of poor or no blood supply, either a consequence of protective sclerosis, of simple soft-tissue fibrosis, or of the isolation of the septic area from the surrounding circulation by a pyogenic wall. A porous foreign body such as a fragment of clothing buried in the tissues, isolates bacteria even more from the blood supply and increases the difficulties of successful resolution of the septic process.

The necessity of emphasizing the importance of the tissues in the fight against infection, particularly among research and laboratory workers, may be ascertained by the results of a careful investigation of the causes of a surgical theatre infection performed during the past two years in a hospital in Oxford: two first-class bacteriologists were asked to investigate the possible cause of infection in the clean cases which suffered from operative sepsis. After more than two years of careful investigation of all possible sources of contamination, including the hands and throats of the surgeons and nurses, the skin of the patients, catgut, instruments, etc., no explanation could be found; it was then realized that to proceed with the research, attention should be given to the condition of the tissues damaged by the operation and the investigation is now being carried on to elucidate the effect upon the tissues of factors such as exposure to the over "conditioned" air of the modern theatre, damage caused to the skin by clips and forceps used to secure towels, etc. Thus there has been a complete swing over from a fruitless search for a seed to a consideration of the care of the soil.

I hope that I shall not be accused of departing from the Listerian teaching, if, as a surgeon, I emphasize the part we still play in concentrat-

ing our research on the reactions of the human body, not only by investigations on animals in a laboratory but by direct study of the behaviour of human tissues and organs; in fact, we may say that the surgical is the only section of the medical profession that is able to manipulate human tissues with impunity, the same impunity that allowed Harvey Cushing to systematize the surgery of the encephalitic tissues.

Let me stress once more my conviction that we surgeons, who by the fate of our art are confronted with the crudest reality, have confirmed by our daily "experiments" in the operating theatres that in medicine nothing is as true as what the Bible teaches us—that "the life of all flesh is the blood thereof". The realization of this outstanding principle is, I humbly think, even more important than all the wonderful advances towards completion of the vitaminic alphabet. And the day when we know the changes that diseases or the action of various stimuli cause to the blood supply of any part of the body, we shall probably be able to explain to our satisfaction what is the reason for disturbances apparently as different as the lack of union of fractures and the degeneration of the liver.

In ending this address which you have so patiently endured, I would like to strike an optimistic note. Let us hope that when the problems of the circulation are everywhere well understood and the pattern and changes of the circulation of all the organs, including the encephalic circulation, are clear to us, we will be able to understand, and perhaps correct, its deviations with their varying effects on the brain from simple excessive tendency to sleep to the terrible degradation of mental disease. We shall perhaps one day be able, when we know the intimacies of the circulation in other organs, to explain the cause of peptic ulcers or of essential hypertension, two of the most rebellious affections of modern man. The surgical contribution in this field might be very important and would allow surgery to be considered, if not one of the biological sciences—it is too complex for that—at least one of the applied sciences. By such a revolution we could look to our distant past with a grateful smile for it is to our fidelity towards the attributes of our surgical ancestors, namely to their simplicity of mind and power of observation, together with their lack of

scholastic prejudice, that we owe any achievements we may make towards truth. In the meantime, we shall be able to join our medical colleagues of the "Long Gown" and be accepted by them, if not as real scientists, at least as artisans of progress.

THE USE OF THE ARTIFICIAL KIDNEY IN THE TREATMENT OF URÆMIA* (Preliminary Report)

John T. MacLean, M.D.,
Charles B. Ripstein, M.D., F.R.C.S.[C.],
Nannie K. M. de Leeuw, M.D.† and
G. Gavin Miller, M.D., F.R.C.S.[C.]

Montreal, Que.

THE principle of the artificial kidney is not new. Abel, Rowntree and Turner² introduced the term in 1913 to describe a dialyzing apparatus which they used successfully on experimental animals. The idea could not be applied to humans at that time because of the lack of a safe anticoagulant and the unavailability of a suitable dialyzing membrane. The clinical introduction of heparin⁶ and the development of cellophane (cellulose acetate) tubing solved these problems and left the way open for the production of an apparatus which could take over the function of the damaged kidneys and remove nitrogenous waste products from the circulating blood. Kolff⁵ in Holland, and Murray³ in Canada independently developed "artificial kidneys" and demonstrated their effectiveness in experimental animals and in human cases of uræmia.

The chief clinical value of such an apparatus, at present, lies in the possibility of treating uræmia due to reversible or curable conditions of the kidney. In such cases a temporary clearing of the blood by dialysis may prove a life-saving measure. Successful cases have been reported by Murray³ and Kolff⁵ using the artificial kidney; and by Fine, Seligman and Frank;⁷ Strean, Korenberg and Portnuff;⁸ and Goodyear and Beard⁹ utilizing peritoneal irrigation. This last procedure has the disad-

* From the Departments of Surgery and Urology, Royal Victoria Hospital, Montreal, Que.

† Archibald Fellow in the Department of Experimental Surgery, McGill University.

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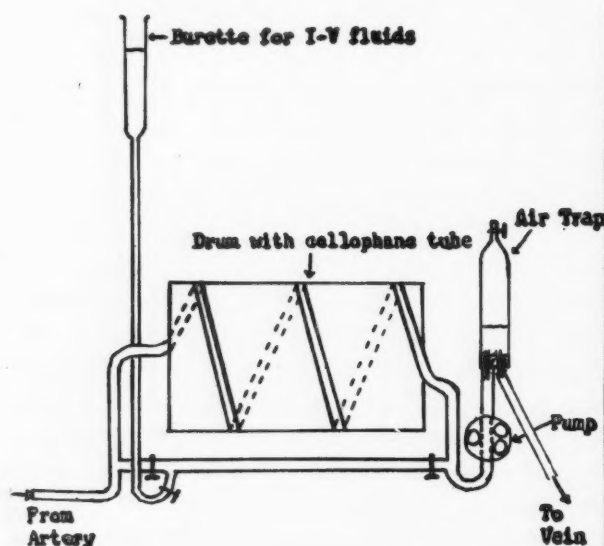
vantages of being less efficient and more dangerous than the artificial kidney, but it is simpler and requires little special apparatus.

The types of uræmia in which dialysis may be of value can be listed as follows:

1. *Acute renal lesions with uræmia.*—(a) Fulminating acute glomerulonephritis. (b) Acute poisoning—mercury, phenol, etc.

2. *Lower nephron nephrosis type of lesion.*¹⁰—Anuria following (a) incompatible transfusion; (b) sulfonamide administration; (c) the crush syndrome; (d) severe burns; (e) eclampsia.

3. *To prepare the uræmic patient for a surgical procedure.*—(a) Prostatic obstruction. (b) Infections of the kidney.



SCHEMATIC DIAGRAM OF ARTIFICIAL KIDNEY.

Fig. 1

DESCRIPTION OF THE APPARATUS (FIG. 1)

The machine used at the Royal Victoria Hospital was obtained from Dr. W. J. Kolff of Kampen, Holland. Certain modifications have been added as suggested by Dr. M. Korenberg,¹² to make the apparatus more efficient and easier to control. The artificial kidney consists of a large wooden drum around which 100 feet of cellophane tubing is wound in spiral fashion. This tubing has a flat diameter of 1 inch. The drum revolves at a constant speed of 25 revolutions per minute in a bath of the following composition: NaCl, 0.6%; KCl, 0.04%; NaHCO₃, 0.2%; glucose, 1.5 to 2%; tap water, 100 litres.

The patient's blood enters the cellophane gut from a cannula in the radial artery. The tubing carrying the blood passes on to the drum through a rotating coupling. At the other end, the blood passes through another rotating coupling into an air trap and thence via a glass cannula into a forearm vein. A variable speed pump is provided at this point to facilitate the circulation. The rotary movement of the drum spreads the blood into a thin film on the surface of the cellophane tubing, thus exposing a greater surface area to the bath and requiring only 500 c.c. of blood to fill the tubing.

The bath fluid is kept at a constant temperature of 100° F. by a thermostatically controlled heating element.

The couplings, the air trap, and the glass and rubber connecting tubes are sterilized by autoclaving and the cellophane is sterilized by boiling. The rest of the apparatus does not have to be sterile (Fig. 2).

TECHNIQUE OF DIALYSIS

The artificial kidney is set up, and ten litres of sterile saline are run through the tubing as a rinse. The apparatus is then filled with 500 c.c. of saline solution containing 150 mgm. of heparin. If the patient is anæmic or in poor condition, the tubing can be filled with 500 c.c. of heparinized blood.

A blood pressure cuff is wrapped around the patient's arm to be used as a tourniquet in case of hæmorrhage. A cut-down is then made on a forearm vein and a glass cannula inserted and connected with a continuous saline drip. The radial artery is next exposed, and after the patient has been given 150 mgm. of heparin intravenously, a glass cannula is inserted into the artery and connected to the artificial kidney. Metal connections and cannulas are avoided for fear of inactivating heparin. The blood traverses the cellophane tubing by the force of arterial pressure aided by the rotation of the drum and is returned into the patient's vein by a variable speed pump. Blood or intravenous fluids can be added to the circuit as required and blood samples can be removed at will from arterial or venous tubes. Venipuncture is considered hazardous in the heparinized patient.

During the course of the dialysis the patient's blood is kept liquid by adding 50 mgm. of heparin to the circuit every 1½ to 2 hours. We have found that large amounts of heparin are necessary because a significant quantity is lost by dialysis. It is much better to give too much than too little, and in case of severe bleeding, protamine sulphate can be used intravenously to neutralize the anticoagulant effect.

Throughout the procedure the patient is carefully observed and pulse and blood pressure are recorded at frequent intervals. The dialysis is continued for 2 to 10 hours, until the non-protein nitrogen reaches a normal level. The blood non-protein nitrogen and CO₂ combining power are determined at hourly intervals.

EFFECTS OF DIALYSIS ON THE PATIENT

I. Blood chemistry.

(a) *The non-protein nitrogen decreases at a rate of 10 to 30 mgm. % per hour; the bath water non-protein nitrogen increases proportion-*

ately. (b) *Blood chloride* remains constant. (c) *Blood calcium* tends to fall. This can be prevented by giving the patient 10 gm. of calcium gluconate I-V every 3 hours. Calcium salts added to the bath water precipitate out. (d) *Acid-base balance*. There is often a tendency to acidosis which can be counterbalanced by giving 1/6 molar sodium lactate I-V in 500 c.c. amounts, when the CO_2 combining power falls below 50. An alternative, though more complicated method, is to bubble CO_2 through the bath under an enclosing hood. (e) *Blood sugar* rises because the bath water contains a high concentration of glucose to avoid hemolysis. This can be



Fig. 2

utilized by the patient. In some cases the administration of insulin may be advisable.

II. Blood morphology.

(a) *Coagulation time* has remained markedly elevated in all cases because of the large doses of heparin. In case 2, despite a coagulation time of one hour in the circulating blood, clotting occurred in the cellophane tubing. This emphasizes the fact that heparin is lost by dialysis and large doses are required to keep the blood in a fluid state. (b) *Blood cells*. The red cells show no change on dialysis and hemolysis does not occur. The white cells undergo an initial fall which is followed in several hours by a return to normal values. These effects will be considered in more detail in a subsequent publication.¹¹

III. *Cardiovascular system*.—The artificial kidney acts as an arterio-venous shunt and this

imposes an extra strain on the cardiovascular system. To date we have observed no ill effects from this and the patients have stood the dialysis extremely well with little or no change in pulse and blood pressure.

IV. *Subjective changes*.—These were impossible to evaluate in Case 1 who remained comatose throughout and in Case 2 in whom the dialysis was discontinued after one hour. In Case 3 a rather striking change was noted. After three hours the patient volunteered the information that her head felt clear and that the dirty taste in her mouth was gone. This coincided with a drop in her non-protein nitrogen from 102 to 49 mgm. %.

V. *Urinary changes*.—The urinary output increases as the uræmia decreases. This was

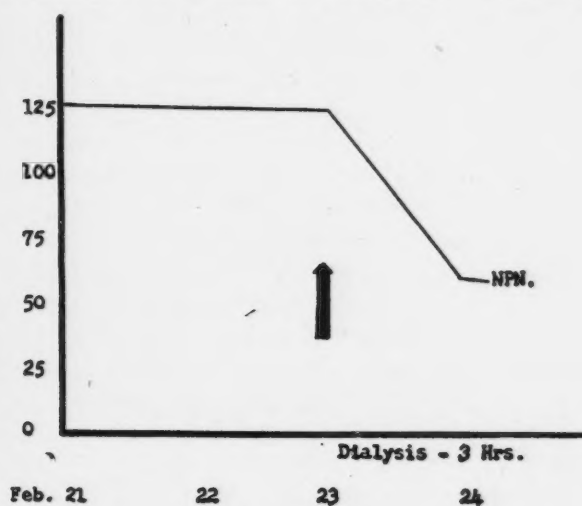


Fig. 3

strikingly shown in Case 2 (Fig. 4). The other urinary constituents did not undergo any apparent change.

CASE 1

Patient W.L., male, aged 69, was admitted to the Royal Victoria Hospital, February 20, 1948, with a history of acute urinary retention of four days' duration.

On examination the patient was dehydrated, stuporous and cachectic. There was evidence of marked generalized arteriosclerosis. The bladder was distended to the level of the umbilicus and the prostate gland was enlarged. Attempts at catheterization failed and a suprapubic cystotomy was done under spinal anaesthesia. This failed to relieve the uræmic symptoms and because the patient was also suffering from advanced coronary artery disease and left lower lobe pneumonia, his condition appeared hopeless. He was connected to the artificial kidney February 23, in a moribund condition. Dialysis was carried out for 3 hours. During this time his blood pressure remained around 80/40 with a pulse of 120. The blood non-protein nitrogen dropped from 121.5 to 60.8 mgm. % (Fig. 3).

He was returned to the ward and expired about two hours after the dialysis.

This patient was moribund when treatment was started and despite a satisfactory lowering of his non-protein nitrogen died soon after the kidney was disconnected.

CASE 2

Patient J.W., male, aged 33, was admitted to the Royal Victoria Hospital March 3, 1948, with a history of having consumed 75 grains of phenobarbital the day of admission. He was comatose on entering the hospital and despite treatment with benzedrine and picrotoxine I-V, he remained in a stuporous condition. At the time of admission his urinary output was normal and his non-protein nitrogen was 12.9 mgm. %. He developed thrombophlebitis and superficial gangrene of the left leg and on March 10, six days after admission, he became anuric. This continued for five days during which time his non-protein nitrogen rose to 189 mgm. %. On March 14, he was connected to the artificial kidney. Because his prothrombin time was 60 sec. and there was evidence of severe liver damage, the usual dose of heparin was cut in half. Despite a coagulation time of one hour there was some clotting in the cellophane tubing and this necessitated stopping the dialysis after one hour. During this time his non-protein nitrogen dropped to 135.5 mgm. %. The following day his urine output began to increase and his non-protein nitrogen continued to drop, reaching a normal level of 37 mgm. % on March 17 (Fig. 4).

There is some question as to whether or not the dialysis was responsible for the beneficial effect in this case. It may have relieved the load on the kidneys just enough to permit return of function, or the drop in non-protein nitrogen and increase in urinary output may have

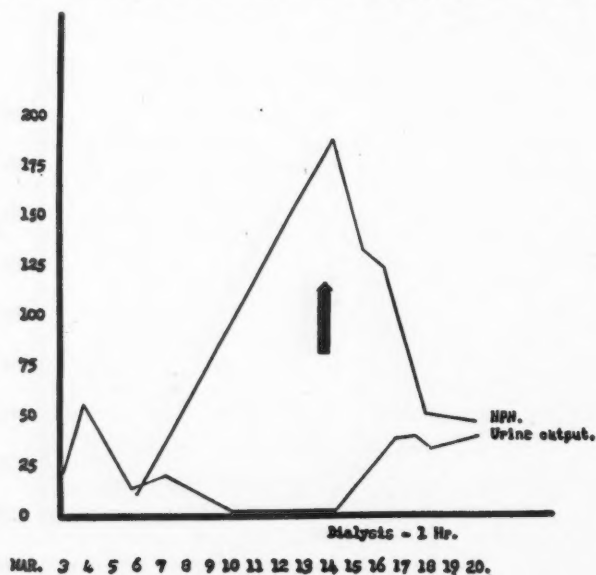


Fig. 4

been coincidental. In any case, this patient shows no signs of impaired renal function at present.

CASE 3

Patient H.T., female, aged 55, was admitted to the Royal Victoria Hospital March 12, 1948. She gave a long history of many previous illnesses including a carcinoma of the thyroid which had been treated by surgery and radiation. Her presenting complaints on admission were abdominal pain, hypertension, nausea and vomiting. A diagnosis of polycystic kidneys with secondary pyonephrosis and uræmia was established. Her non-protein nitrogen rose from 88.5 mgm. %, on March 13, to 159 mgm. % on March 15. Cystoscopy and drainage caused a drop to 102 mgm. % on March 17. However, her urinary output decreased from 450 to 130 c.c. in 24 hours, and her symptoms became more marked. She complained of headache, stupor and a dry dirty taste in her mouth and seemed to be going rapidly downhill. She was connected to the artificial kidney March 17. Dialysis was continued for six hours during which time her non-protein nitrogen dropped to 48.0 mgm. %. She

had a mild acidosis during the procedure, the CO_2 combining power dropping to 30.4. This was corrected with 1,000 c.c. of 1/6 molar sodium lactate and the CO_2 combining power rose to 48.

The patient tolerated the dialysis extremely well and after three hours volunteered that her head felt clear and the dirty taste was gone from her mouth. Following the treatment she seemed improved and her daily urinary output increased to 600 c.c.

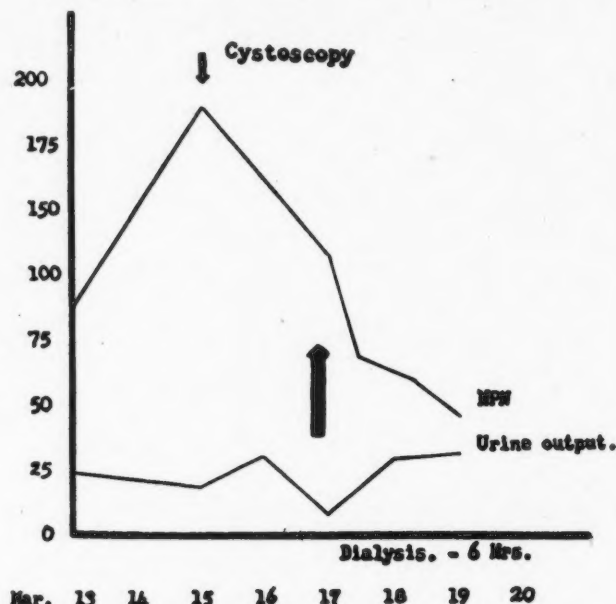


Fig. 5

This patient has an incurable renal lesion but it is hoped that by clearing her blood of waste products and treating her renal infection she will recover sufficient kidney function to maintain life.

COMMENT

The artificial kidney appears to be an effective method of removing waste products from the blood in cases of uræmia. Its clinical usefulness, in theory, is limited to those patients in whom the renal damage is temporary, or reversible. It provides a means of saving such patients from death, and certainly justifies its existence in any large centre. It is well tolerated by the patient and apparently causes few harmful effects. As an investigative tool the apparatus has a large field. It should prove valuable in studying uræmia because some "toxic" factor appears to be removed from the blood and may be present in the filtrate. In addition it is a good method of studying the metabolism of various diffusible substances in the experimental animal and in the human.

SUMMARY

1. The technique of the use of the artificial kidney is described.
2. The effects of dialysis, on the patient, are discussed.

3. Three clinical cases are presented in which the artificial kidney has been used.

We would like to thank Mr. Peter Samuel's for his technical assistance and Drs. A. B. Hawthorne, J. H. Palmer and W. de M. Scriver for referral of cases.

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CHRONIC HEPATITIS*

J. M. Kilgour, M.D., M.R.C.P. (Lond.),
F.R.C.P. [C.]†

THOUGH it has been appreciated before, the great epidemics of infectious hepatitis of World War II, emphasized the fact that a proportion of acute cases did not recover promptly but continued to exhibit clinical and laboratory evidence of hepatitis for months or even years. In 1945, Barber, Copps and Allen¹ published a complete description of this syndrome based on a large series in the Mediterranean and since their report a number of further reports have appeared,^{1 to 6} confirming and enlarging their description. The term chronic hepatitis has been used to describe the condition and cases persisting for longer than four months included arbitrarily.

The clinical syndrome is distinctive. After an initial attack of acute hepatitis, usually, but not invariably accompanied by manifest jaundice, and which is often unusually prolonged, there is partial but not complete recovery. There follow symptoms, both general and local, which may or may not be interspersed with relapses of jaundice. The outstanding general symptoms are physical lassitude and fatigability; commonly accompanied by a failure to regain normal weight. There may be varying degrees of mental inertia, aggravated by the lack of physical stamina. Fever, leucocytosis, anaemia or elevation of the sedimentation rate

are usually absent, except in relapse, but varying degrees of anorexia, intolerance to heavy meals and flatulent dyspepsia are common. The constant local symptoms are those referred to the region of the liver, consisting of heaviness or discomfort, sometimes actual pain, characteristically aggravated by physical exertion or jolting. The only constant physical sign is the presence of enlargement and tenderness of the liver which may be present only after exertion. Relapses are usually characterized by aggravation of all symptoms and the appearance of jaundice which may be profound and prolonged. Laboratory tests always show some disturbance of liver function. No single procedure is constantly reliable but the serum bilirubin, urine urobilinogen excretion, thymol turbidity, cephalin flocculation and bromsulphalein retention tests are the most reliable, both in diagnosis and in following the progress of the disease.

The clinical course is variable and must usually be measured in months rather than weeks. Relapses of jaundice or subicteric relapses with aggravation of symptoms usually delay recovery in direct proportion to their severity and duration. There are several other factors which may be, to a certain extent controllable, which affect the course. Inadequate treatment of the initial attacks, particularly too early return to activity, is generally conceded^{1, 3, 4, 6} to be a major factor in increasing the incidence of chronic hepatitis, and continuance of activity delays recovery. Undernutrition, intercurrent or coincident infections and either traumatic injury or surgical operations tend to precipitate relapse and delay recovery. There is some evidence⁶ that increasing age is a factor in delaying recovery.

The exact incidence of chronic hepatitis is most difficult to assess. Various estimates^{1, 2, 6} suggest that from 10 to 20% of acute cases show activity for longer than four months. But the impression to be gained from clinical experience in large epidemics is that this estimate is probably too high. The duration also is variable: 44% of one¹ series recovered within three months on treatment but the outcome of the remainder could not be followed. In another series⁴ of cases of up to eighteen months' duration, 44% recovered completely, another 44% recovered symptomatically but laboratory evidence of impaired liver function

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† Department of Medicine, Winnipeg Clinic, Winnipeg, Manitoba.

persisted, 8% recovered objectively but had residual symptoms and only 4% failed to recover but the author did not state the recovery time or period of observation. In a third series, 87% of chronic cases were apparently fully recovered within a year but 13% had failed to recover with careful management. From the available figures it would appear to be a justifiable estimate that not more than 2% of patients having had acute infectious hepatitis show evidence of chronic hepatitis one year after the onset of their disease but it is this small percentage of chronic cases that are of the greatest interest at the present time.

In the past year we have observed four patients who have had active hepatitis in varying degree for thirty to forty months.

CASE 1

A 29-year old locomotive fireman, was a prisoner of war in Germany. Although considerably underweight, he had had no illness until April, 1945 when he developed extreme malaise, dark urine and jaundice while on a forced march across Germany. He was forced to drop out of the march and several weeks later, when liberated, felt somewhat better and accordingly did not report his illness, attributing it to the effects of his prolonged privations. He returned to Canada and was discharged as physically fit, although he had not regained his former weight and felt continually tired, as he termed it, "dragged out". During 1946 and the first half of 1947 he sought medical advice on a number of occasions for an aching pain over his right lower ribs, noticed especially after a day's run on the locomotive but which was relieved by rest. His appetite was poor. In September, 1947 he abruptly developed marked anorexia, vomiting and dark urine and in a few days, jaundice, and stated that these symptoms were identical with those he had had in Germany.

He was admitted to hospital in October, 1947. On admission he had improved but still showed moderate jaundice with a total serum bilirubin of 4.6 mgm. %, with over 2 mgm. of one minute bilirubin. His liver was palpable 6 cm. below the costal margin but the spleen was not palpable. There were no other abnormal physical findings. The plasma proteins were qualitatively abnormal as evidenced by a 4 plus cephalin cholesterol flocculation test and quantitatively diminished to 5.94 gm. % with only 3.1 gm. of albumin. The total blood cholesterol was elevated and the urine urobilinogen increased. After a month's rest in hospital with a high protein diet, the liver was no longer palpable and his pain which had been present for over two years was absent at rest. The cephalin flocculation test was negative. There was no bromsulphalein retention and the serum bilirubin alone was slightly elevated, 1.6 mgm. %. This has since returned to normal.

Unfortunately this patient's initial jaundice was never documented but he seemed a reliable witness and the history in the intervening two years was quite definite. It was felt that the recent jaundice was not a new infection, but the clinical picture was that of a continuing active hepatitis which after two years relapsed. It may be worthy of note that in this patient

there were several factors which have been considered to lead to chronicity, namely, an untreated initial attack in an undernourished individual, and that although he subsequently was well fed, the active process persisted while he led a fairly strenuous life. The fact that he has regained normal liver function and that his liver has receded to normal size suggests that complete recovery may occur after thirty months, although the final test of full activity has yet to be applied. Unfortunately, no biopsy of his liver is available.

CASE 2

A 34-year old ex-officer, was severely wounded in Italy in August, 1944, the chief wounds being a head injury and a below-the-knee amputation. Several weeks later, while in hospital, he developed severe anorexia, dark urine and yellow sclerae but by this time he was en route to England and on arrival in hospital there, his jaundice had cleared, although anorexia and malaise continued. These symptoms were not investigated and he was returned to Canada, ultimately being discharged. During 1945, he spent most of the time convalescing from his wounds but continued to be underweight and to complain of anorexia, dyspepsia and an ache in his right upper quadrant. Finally, in February, 1946, his symptoms were investigated. He was found to have an enlarged, firm, tender liver, 6 cm. below the costal margin. The spleen was not palpable. Malaria, amebiasis and other intestinal disorders were excluded. There was no elevation of the serum bilirubin but the cephalin flocculation test was 2 plus and there was 40% bromsulphalein retention in 45 minutes. For the next six months he was kept under strict rest in hospital with suitable diet and improved symptomatically. The bromsulphalein retention fell to 16% but the size and consistence of the liver were unchanged. In February, 1947, the bromsulphalein retention was 9.8% and he was discharged still complaining of poor appetite. By October, 1947, all liver function tests were normal but the liver was still 6 cm. below the costal margin, and abnormally firm. Again no biopsy was obtained. For the past nine months he has led as active a life as his disabilities permit without clinical or laboratory evidence of relapse. Nevertheless, in view of the enlarged, firm liver one can hardly escape the conclusion that the liver, though functionally intact, has been left with permanent changes, presumably diffuse fibrosis.

These two cases would seem to indicate that even after two years of continuous symptoms complete clinical recovery is possible. Mallory has reported complete anatomical normality in the liver after a year of hepatitis, but unfortunately biopsies have not been obtained in either of these patients. In the second case permanent anatomical change in the liver can, I believe, be assumed but this does not indicate that future relapses or progression must necessarily occur and it is entirely possible that the disease has been arrested, leaving a scarred liver, functionally intact, such as is not infrequently an incidental finding at autopsy.

The remaining two cases represent a further stage and are even more difficult to prognosticate.

CASE 3

A 56-year old man, who at the age of 44, had a cholecystectomy for calculous cholecystitis without evidence of common duct obstruction and at operation the liver was grossly normal. He was completely symptom-free until February, 1945, ten years later, when he developed fatigue and anorexia, and several weeks later was frankly jaundiced. Because of the history and his age, he was thoroughly investigated. The liver and spleen were not palpable. By exclusion and because of the 4 plus cephalin flocculation test, and the fact that the jaundice commenced to recede within ten days, a diagnosis of infectious hepatitis was made. He attempted to resume active life immediately but continued to have anorexia, fatigability and aching pain in the region of his liver. The urine was periodically dark. Four months later, in June, 1945, he was re-investigated and found to have an elevated serum bilirubin (4.4 mgm. %), increased urine urobilinogen (8.8 Ehrlich units in two hours), diminished hippuric acid excretion (0.6 gm.) and both the thymol turbidity and cephalin flocculation tests were positive.

There was little improvement after two months' complete rest and in September, 1945, six months after the onset, a liver biopsy was performed (Fig. 1). This showed relatively normal hepatic architecture with a

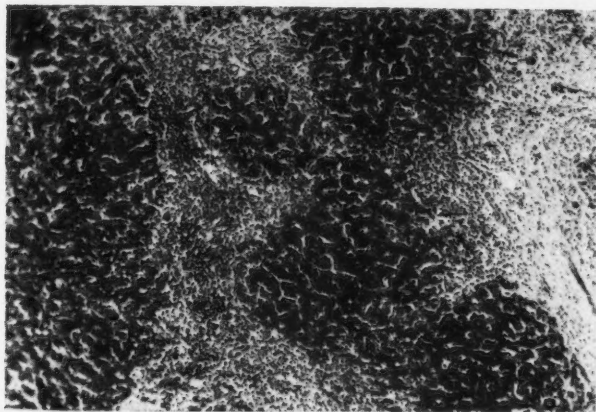


Fig. 1. (Case 3). Section showing periportal inflammatory infiltration with no fibrosis. The liver cell columns are slightly irregular but otherwise normal.

moderate round cell infiltration of the portal tracts in some areas extending into the lobules. There was equivocal, if any, portal fibrosis and no evidence of cell or bile duct proliferation. The picture is that of a diffuse hepatitis without histological necrosis or cirrhosis and could correspond to the description of subsiding acute hepatitis.

During the winter of 1945-46, there was an exacerbation of jaundice with mild pruritus. In March, 1946, improvement occurred and by July, 1946, although still fatiguing easily and having some discomfort in the region of the liver, he resumed activity. In December, 1946, there was another exacerbation of symptoms and severe jaundice developed. With this attack there was marked evidence of hepatic insufficiency, with oedema, ascites of moderate degree, hypoproteinaemia, prothrombin deficiency, and anaemia. After four months in bed with high protein diet, improvement occurred and by July of 1947 the oedema and ascites had subsided, the jaundice had disappeared but the plasma proteins had not reached normal values and the cephalin flocculation and thymol turbidity tests were positive. At no time was either the liver or spleen palpable. Several spider angiomas appeared but there has been no evidence of portal obstruction.

Although the biopsy six months after the onset showed no definite evidence of cirrhosis, the

subsequent clinical course and residual impairment of liver function suggest that some degree of cirrhosis has since occurred. Nevertheless the present course is toward recovery and the patient is now better than at any time in the

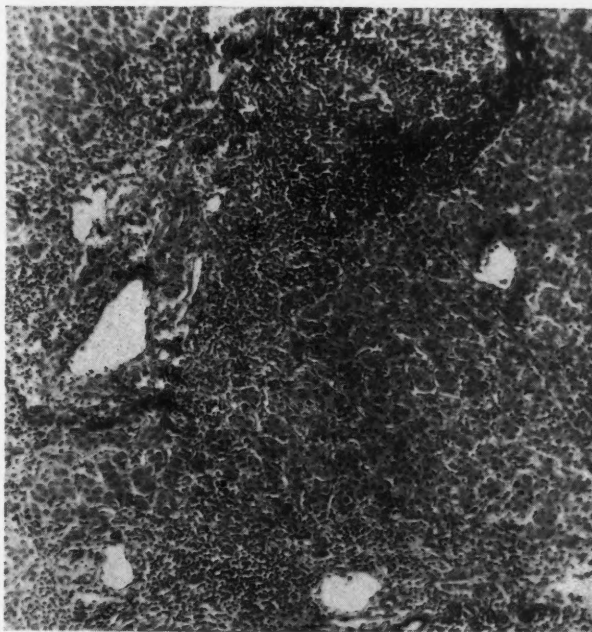


Fig. 2. (Case 4). Section showing reduction in the size of the hepatic lobules, portal fibrosis and inflammatory infiltration.

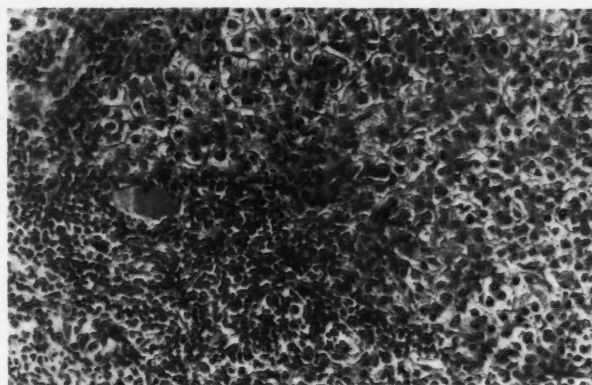


Fig. 3. (Case 4). (H. and E. x 175). Sections of liver showing inflammatory exudate in the portal tracts.

past three years. Only time will tell whether further relapse will occur.

CASE 4

This patient developed acute infectious hepatitis while serving as a driver in England in November, 1944. He was discharged from hospital six weeks later and returned to duty after several weeks in a convalescent depot. Though able to carry on as a driver he failed to regain his former health or weight. He had dyspepsia, anorexia and marked lack of stamina. Prolonged driving produced aching pain in his right side relieved overnight. In July, 1945 and again in July, 1946 he had mild attacks of jaundice of two to three weeks' duration

but on each occasion recovered to about his original post-jaundice state. In September, 1946, 22 months after the onset of his illness, he had a third exacerbation of symptoms and jaundice and was finally hospitalized for the second time in October, 1946. The important clinical features were moderate jaundice, with bile and urobilinogen in the urine. The liver was enlarged 4 cm. below the costal margin but the spleen was not palpable. There was no oedema or ascites. The cephalin flocculation test was 2 plus.

During the next four months, despite complete rest and adequate diet, there was no improvement. In fact, there was evidence of further impairment of liver function indicated by a drop in plasma albumin. Finally, in February, 1947, exploratory laparotomy was performed. Although no obstructive lesion was demonstrated, the extra-hepatic bile ducts contained inspissated bile and the liver was enlarged and granular in appearance. Drainage of the common duct was established and a liver biopsy performed. The biopsy showed a diffuse inflammatory exudate in the portal tracts and, in addition, definite portal cirrhosis (Figs. 2 and 3). There were a few bile thrombi. Postoperatively the jaundice increased, the cephalin flocculation became 3 plus and his spleen became palpable. In spite of adequate drainage, little change occurred for several months but since July, 1947 he has shown slight improvement. At present, 30 months after the onset, and 14 months after the onset of the third relapse, he is still jaundiced, has enlargement of the liver and spleen but no ascites or evidence of portal obstruction. He is still in hospital.

Four cases have been cited with hepatitis of from 30 to 36 months' duration. One apparently is recovering without clinical evidence of cirrhosis. The other three show definite clinical evidence and one undoubted histological evidence of hepatic cirrhosis. Of the cases believed to have cirrhosis one is apparently arrested, another improving but the third presents the clinical picture of Hanot's cirrhosis, namely chronic jaundice with enlargement of the liver and spleen but without ascites.

The reason for persistence of the hepatitis is not known. Clinically, it appears to arise from and be continuous with the original virus infection. Although it is a tempting speculation, there is as yet no proof that persistence of the virus is the cause of this continued activity and attempts to transmit the chronic disease to human volunteers have given inconclusive results.⁷ Watson³ has suggested that the prolonged course in some cases may be due to a more severe involvement of the intra-lobular bile canaliculi and has cited several cases which apparently led to cirrhosis. There is no convincing evidence that dietary deficiency plays any part and certainly diet alone has had little effect in hastening recovery. There does, however, appear to be a relationship between the premature return to activity and persistence of the hepatitis and it is perhaps significant that in none of the four cases reported was the

initial attack adequately treated or prolonged rest maintained after relapse. The only means of treatment which appears to hasten recovery is prolonged rest and the maintenance of optimum nutrition. Chronic hepatitis should be treated in much the same way as is tuberculosis, by a sanatorium regimen of complete rest until all clinical and laboratory evidence has disappeared and once this has been attained return to active life should be gradual and governed by repeated liver function studies.

SUMMARY AND CONCLUSIONS

The syndrome of chronic hepatitis is a distinct one which may follow either epidemic infectious hepatitis or homologous serum hepatitis. It is particularly liable to follow cases of the acute disease which have been allowed to return to activity before recovery is complete or in patients who have been undernourished, affected with concurrent disease or subjected to trauma or surgical operations at the time of onset but it does occur in the absence of any of these factors. The actual cause of the prolongation of the hepatitis is unknown.

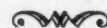
Complete recovery occurs in the great majority but a small percentage progress to cirrhosis. Four cases of thirty to forty months' duration have been presented, one of whom has proved cirrhosis, two presumptive cirrhosis and one with apparent complete recovery.

It is possible that the progress may be arrested and complete functional recovery occur, even though cirrhosis has developed but as yet insufficient time has elapsed to exclude relapse in the cases reported.

The most effective treatment at present is prolonged rest and maintenance of optimum nutrition until all clinical and laboratory evidence of activity has disappeared.

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VENOGRAPHY IN THE NORMAL AND PATHOLOGICAL LEG*

Lieut.-Col. G. H. Raymond, R.C.A.M.C.,
G. T. Adams, B.A., M.D. and
J. R. McCorriston, B.A., M.D., C.M.

Montreal, Que.

VENOGRAPHY or phlebography is a visual study of the venous systems of the body by means of x-rays. Our interest in this procedure was aroused by numerous discussions regarding thrombophlebitis and phlebothrombosis of the lower extremities. It was felt that some diagnostic aid might be derived by this means.

The idea of venography is by no means new, as many workers have written of their experiences with it. Sgalitzer, apparently, was the first in the field, when in 1931, he wrote of outlining varicose veins. Barber, in 1932, duplicated this study. In 1935, Don Santos noted the irregular outline of thrombosed veins. And, in 1943, Luke published an account of the venous circulation in the varicose extremity. It is noted that these earlier workers confined their studies to varicose veins. However, Bauer of Sweden, in 1940, extended the problem and produced a classic work in a "Venographic Study of Thrombo-Embolie Problems". Homans, in 1940, published a paper on venography and paid tribute to Bauer's work. In 1942, Welch, Faxon and McGahey published the description of a new technique for venography, and drew attention to the possibilities and short-comings of the examination.

This study covers 113 venograms in 100 patients. Our aims have been three-fold: (1) To develop a technique. (2) To identify structures and to interpret findings in normals. (3) To demonstrate and identify pathological changes.

Following the lead of Bauer and Homans we have used 35% diodrast, the same as that used in pyelography, as the radio-opaque contrast medium. Because an occasional individual is sensitive to this drug, each patient is tested by placing one drop of the solution in the conjunctival sac prior to intravenous use. A red-dening conjunctivitis appearing within five minutes is a danger signal that should preclude the use of the dye. As a further precaution it is preferable that the patient be fasting, as a certain percentage of patients suffer from nausea and vomiting when the dye is given shortly after a meal. Bauer and Homans made use of the short saphenous vein as the site of injection, and, in so doing, developed a cut-down exposure of this vein posterior to the lateral malleolus. Upon the suggestion of one of us (G.T.A.) we

injected the contrast medium into the distal end of the long saphenous vein, and by means of a tourniquet around the lower calf, hoped to drive the dye into the deep system of veins in the lower leg. Our results have been reasonably satisfactory. Unknown to us at this time, Welch, Faxon and McGahey of Boston, in 1942, described a very similar technique and obtained similar success. A more detailed description of the technique will be given later in the paper.

It is stated that the venous system of the lower extremity follows no exact pattern. In our brief experience the general appearance of the deep circulation is fairly accurately duplicated from case to case in the normal. In Fig. 1 is presented a diagram reproduced from an average normal venogram showing the common channels visualized. It will be noted that on occasion short segments of tributaries will fill with dye in a retrograde manner back to the most proximal valve.

Any notable deviation from the normal is considered pathological, and is evidenced broadly by a lack of filling of a part or all of the deep circulation, and a positive filling of the superficial system and the collaterals. It is now recognized that phlebothrombosis, in 90% of cases, starts in the veins of the calf muscles and spreads via the deep circulation. This process may be either segmental or a more extensive thrombosis involving the popliteal and superficial femoral and even the common femoral and iliac veins. In this last case, the extent of the thrombosis may be demonstrated by a special technique, injecting the long saphenous vein in the thigh. By combination of a low and a high injection, it is felt that the length and apex of the thrombus can be shown. In phlebothrombosis the pathological process is considered to consist of a thrombus attached by its distal end to the vein wall, while the remainder of the thrombus waves freely in the venous stream like an eel. This phenomenon can, on occasion, be demonstrated and to it Bauer applied the descriptive name of "mantle" shadow, as the contrast medium shows up the peripheral stream in the vein while the centre appears as a filling defect. A common observation in thrombo-embolic disease is the occurrence of vasospasm. This also can be readily shown, as can the release of spasm following the use of various therapeutic measures.

* From the Queen Mary Veterans' Hospital, Montreal.

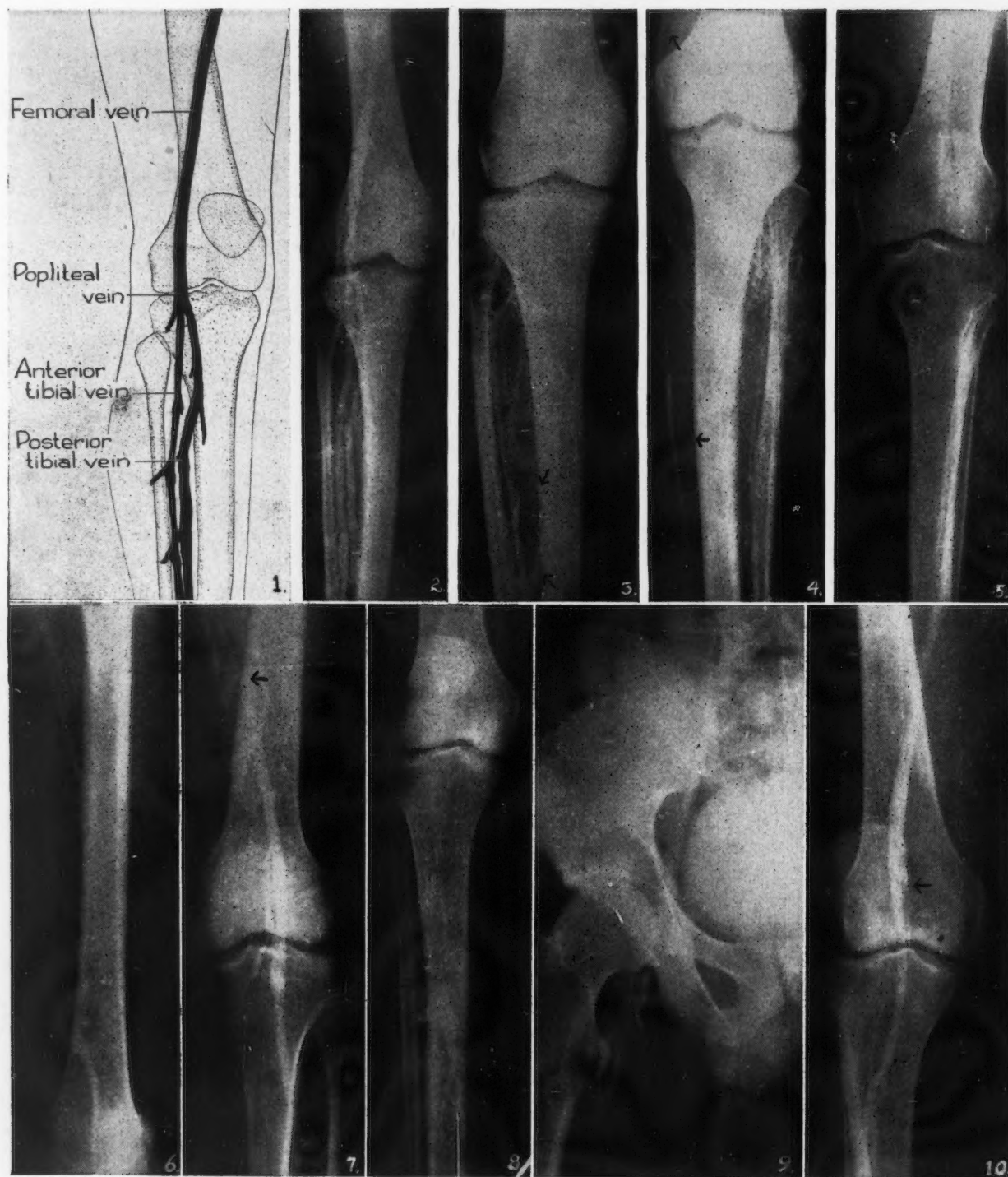


Fig. 2.—Normal venogram. Fig. 3.—Thrombophlebitis. Note absence post-tibial vein with "mantle shadow" at lower end. Fig. 4.—Acute phlebothrombosis. Complete failure of filling of deep veins of calf and thigh. Positive filling of long saphenous and superficial network of veins. Fig. 5.—Seven months after acute deep venous thrombosis of leg and thigh. Note complete absence of deep channels and enlarged long saphenous system. Fig. 6.—Old thrombosis showing profunda femoris vein as only deep channel draining the thigh. Fig. 7.—Segmental thrombosis of femoral vein in thigh with collateral channels circumventing the block. Fig. 8.—Acute thrombosis involving post-tibial. Note also generalized poor filling due to spasm and positive filling of long saphenous chain. Fig. 9.—"High" injection taken 1 hour after Fig. 8 hence presence of dye in bladder. Shows also long saphenous, superficial femoral, stump of profunda, common femoral, external iliac and commencement of vena cava. Fig. 10.—Same patient as Figs. 8 and 9 four days later on anticoagulants shows release of spasm but absent post-tibial except for short proximal stump.

POSSIBILITIES

1. Venography may be used in acute cases of deep venous thrombosis and by it the apex of the obstruction can be outlined. This might be useful if the question of therapeutic ligation is being considered.

2. In cases of chronic swelling of the leg of venous origin, the area of involvement and the collateral vessels can be demonstrated. Again this may assist in decisions regarding therapy.

3. The patency of the deep venous circulation may be demonstrated, so that treatment of varicose veins may be undertaken without fear of occluding the only venous return from the leg. In this respect we have used venography only in cases showing doubtful Trendelenberg tests.

4. Venograms can outline conditions before and after therapy.

5. Two venograms can be done with impunity on the same patient on the same day.

LIMITATIONS

1. The profunda femoris vein is not normally outlined and consequently one is always uncertain as to whether or not it is the site of thrombosis.

2. There is some inconstancy of the connections of the long saphenous vein with the deep veins of the lower leg. On occasion, either the posterior or anterior tibial veins fail to fill, and this might lead the uninitiated to believe that a thrombus is then occupying the lumen. Our procedure in such cases is: (a) The clinical findings must be carefully correlated, particularly as to the site of tenderness. (b) Another venogram should be done, as it has been noticed that occasionally the second will show a more complete filling. (c) A venogram done on the so-called normal leg may show that the anomaly is a bilateral condition.

DANGERS

It is appreciated that certain dangers must be feared. (1) Drug sensitivity has been discussed. (2) There is the possibility of dislodging a piece of the thrombus in an acute case. We know of no recorded case of this happening, and, fortunately have not experienced this accident. (3) The possibility of infection must always be kept in mind. However, it is no more apt to occur than in any other venipunc-

ture. (4) The possibility of inducing thrombus formation also must be considered. Luke, in 1943, recorded such a case while using hippurin. We have not encountered an instance in our series.

TECHNIQUE OF VENOGRAPHY

Our technique was self-developed, but as pointed out earlier, it was found to be almost identical with that described by Welch, Faxon and McGahey of Boston, in 1942. In addition we have tried out those used by Bauer and Homans.

The following, then, is a description of the three methods we favour.

1. "*Low*" injection.—With the patient lying supine, a 14 x 17 inch x-ray film is placed under the leg so that the lower edge is three to four inches above the ankle joint. The heel of the patient is supported on a small sandbag to relieve pressure on the veins due to the weight of the leg. As a precautionary measure the patient is tested for sensitivity to diodrast by the introduction of one drop of the solution into one of the conjunctival sacs. At the end of five minutes the conjunctiva is inspected for evidence of irritation, and if none has developed it is safe to administer the drug intravenously.

Next, the x-ray tube is focussed, and a rubber tourniquet is applied to the leg at the level of the lower edge of the film sufficiently snugly to occlude the superficial venous flow. Twenty cubic centimetres of 35% diodrast are drawn into a syringe with an eccentric nozzle to which is attached a 21 gauge needle 2 inches in length. The needle is inserted into a dorsal vein of the foot or into the long saphenous vein near the medial malleolus. The leg is then rotated medially 20 to 30 degrees to separate the shadows of the tibia and fibula. The injection of the diodrast solution is made at a uniform rate over a period of 60 seconds leaving the tourniquet on the leg.

The purpose of the tourniquet is to force the diodrast to flow proximally via any patent deep veins. Just as the last few drops are being injected the x-ray film is exposed using "bone technique". Occasionally it takes longer than 60 seconds to inject 20 c.c. of diodrast solution. If this is the case the film is not exposed until the last few drops are being injected. In nervous patients it is advisable to anaesthetize the skin at the site of the injection with 2% procaine.

2. *Bauer's method.*—We have used Bauer's technique in a few cases, when, for some reason, direct venipuncture was impractical. This consists of making a 1 cm. incision posterior to the lateral malleolus under local anæsthetic, and introducing the needle into the short saphenous vein under direct vision. In this method no tourniquet is used during the injection of the diodrast. The posturing, timing and x-ray exposure are exactly the same as in the first method.

3. *"High injection."*—For the demonstration of the upper femoral and iliac regions another technique is necessary. The patient again lies supine but the film is placed so that the lower edge is at the junction of the middle and lower thirds of the thigh. The injection, using no tourniquet, is made into the long saphenous vein just proximal to the level of the knee joint. If direct venipuncture cannot be done a short transverse skin incision is used, and the needle is inserted into the vein under direct vision. The posture is in the neutral antero-posterior plane with the x-ray tube centered over the inguinal ligament. Using a larger bore needle, the injection of 20 c.c. of diodrast solution is made uniformly over a period of 5 or 6 seconds. The x-ray film is exposed just as the injection is being completed.

SUMMARY

A safe, graphic, study of the venous system of the lower extremity is described. Its application to thrombo-embolic disease is discussed. The use of venography prior to treatment of varicose veins is suggested in doubtful cases.

We wish to acknowledge the assistance given in the preparation of this paper by the X-ray Department, Mr. D. R. Fisk, the clinical photographer, the surgical and medical staffs of the Queen Mary Veterans' Hospital, and the X-ray Department of Ste. Annes' Veterans' Hospital.

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TWO NEWER TYPES OF IMPLANTS USED AFTER ENUCLEATION*

J. S. Crawford, M.D.

Toronto, Ont.

A GOOD cosmetic result following enucleation entails a normally filled orbit and full motility of the prosthesis. An implant in Tenon's capsule, or in sclera, helps restore the socket and gives a life-like appearance to the artificial eye. However, motility can be assured if the implant and prosthesis are made to interlock so that the movement of the implant is transmitted to the prosthesis. The basket implant and the ball and ring implant of Cutler^{1, 2} do this. They result in a wider excursion of the prosthesis and also transmit the normal, fast, spontaneous movements to the false eye. These attributes help to conceal the fact that the patient is wearing an artificial eye.

The basket implant, the ball and ring implant and the prostheses are all made of lucite (methyl methacrylate). This plastic is easily moulded by the manufacturer and is inert to body tissues. The same type of plastic is used by dentists in the construction of artificial teeth.

THE BASKET IMPLANT

The standard basket measures 11 x 16 mm. The sides are fenestrated, for the invasion of tissues, (Fig. 1 a). There are two small holes in the bottom for the passage of sutures, and the rim is thickened and quite smooth. A lucite button (Fig. 1 b), measuring 5 x 7 mm., and pierced by four 1 mm. holes, and a plastic retainer (Figs. 1 c and 1 d) are also used at the operation. The operative procedure was carried out as described by Cutler.¹ When the socket was healed, a depression is formed corresponding to the concavity of the implant. A conical stud is moulded on the posterior surface of the artificial eye (Fig. 1 e) to fit this depression. Movement of the implant is thus transmitted to the prosthesis.

Results.—Eight implants were used at the time of enucleation and 4 in sockets where the eye had been previously removed. The average

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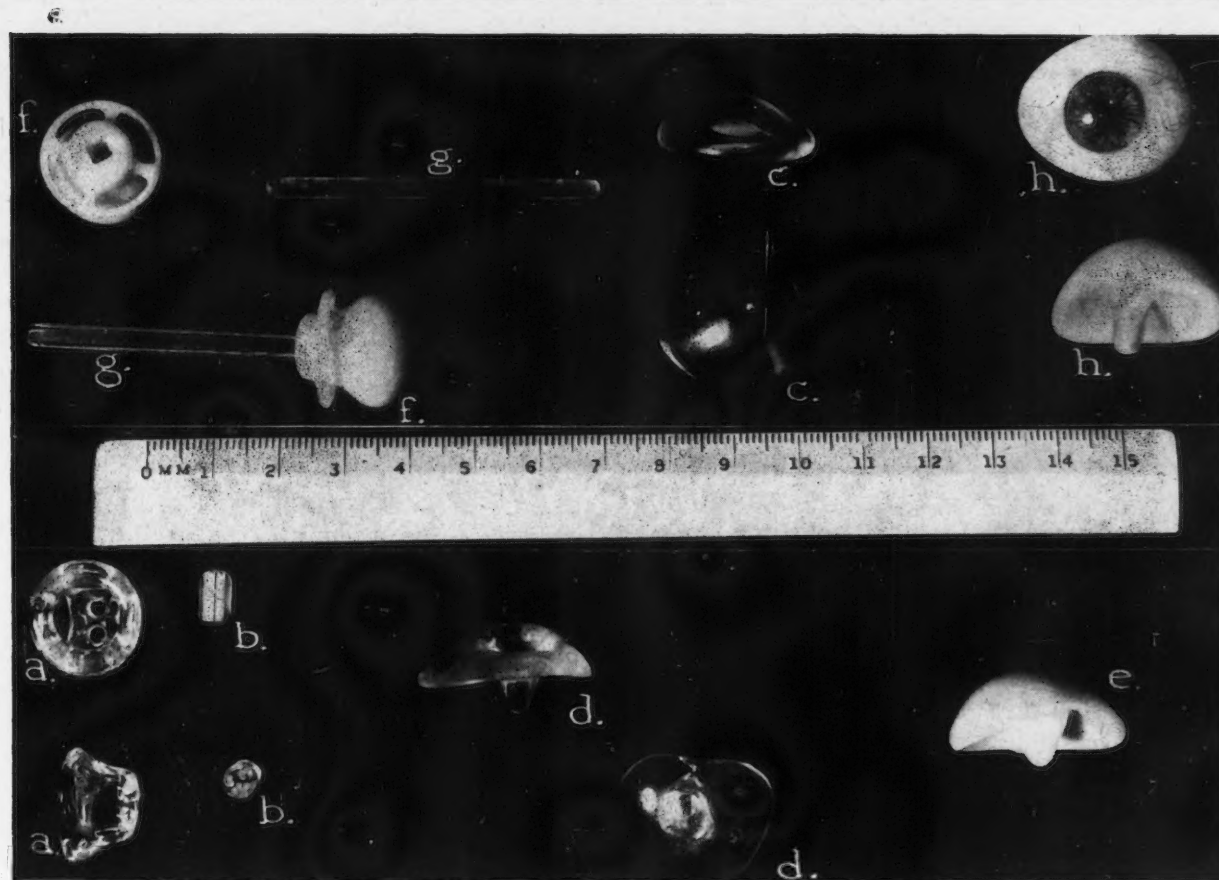


Fig. 1.—(a) Basket implant; (b) plastic button, through which sutures are tied at the time of operation; (c) plastic retainer, placed inside lids after completion of operation; (d) plastic retainer with stud, to be placed in socket after removal of button to maintain depression; (e) artificial eye with stud; (f) ball and ring implant; (g) plastic pin, used for holding implant at time of operation; (h) artificial eye with plastic pin to fit into impression on anterior face of implant.

motion obtained in 8 cases where the basket was inserted at the time of enucleation was 49° horizontally, 51° vertically. That obtained in four patients, where enucleation was done some time before, was 32° horizontally, 32° vertically.

Complications.—In one case where the basket implant was used after enucleation of a microphthalmic eye, the ring of the basket became visible two weeks later, and the basket had to be dissected out. At the time of implantation it was difficult to depress the plastic button into the hollow of the basket because there was little conjunctiva. In one of these delayed cases the rim of the basket became visible at the end of the third week after enucleation, and the basket was removed.

Observations.—Other sizes of implants were tried without improvement in results. The prosthetic movement obtained with this type of implant is better than that obtained with a ball implant or with no implant. It does impose more problems on the artificial eye maker, as he must centre the stud properly so as not to

produce a squinting eye. The postoperative care is involved and demands more care on the part of the surgeon.

Results obtained using the basket implant in cases where the eye had been removed some time before do not warrant the time and care required, and this procedure has been abandoned.

THE BALL AND RING IMPLANT

This type of implant gives direct contact with the prosthesis, and provides a greater range of, and a more spontaneous movement.

Implant.—Cutler's original implant was made of plastic with a gold ring, but due to difficulty of manufacture an all-plastic implant is used, which has proved quite satisfactory. It is coloured pink to blend with the conjunctiva (Fig. 1 f). The implant is spherical in shape, narrowed anteriorly where a ring is attached to the body by four spokes. The ring is separated from the body by 2 mm., to allow attachment of the muscles. Two sizes of spheres are used, an 18 mm. one for adults, where the im-

plant is used at the time of enucleation, and a 16 mm. one for adults where the eye has been removed some time before, and for children. The anterior face of the implant is flattened and has a depression into which fits the plastic pin from the posterior surface of the prosthesis.

Operation.—The procedure may be done under general anaesthetic, either with intravenous pentothal or intra-tracheal anaesthesia. It may be done under local anaesthesia with retrobulbar injection, but I prefer the former type.

The eye is removed in the routine manner and each rectus muscle is secured with a temporary, single-armed, silk suture (Fig. 2 a). The optic nerve is cut with a

is pulled through the ring. The muscle is then pulled through the ring and sutured to itself with a nylon suture (Fig. 2 b). The other three recti muscles are treated in a similar manner, and when this is completed, the four double-armed sutures through conjunctiva and Tenon's capsule are pulled tight and tied, while the assistant aids by pushing these tissues over and through the ring with a small-toothed forceps (Fig. 2 d). The pin is now removed, a small gauze square impregnated with penicillin ointment is placed inside the lids and an eye pad applied.

In cases where the eye has been removed some time previously, Tenon's capsule and conjunctiva are carefully separated. Tenon's capsule is then incised in the upper temporal, lower temporal, lower nasal, and upper nasal positions (Fig. 2 e). It is thus divided into four slips which are sutured over the ring of the implant in the manner of the four recti muscles (Fig. 2 f). The conjunctiva is then carried over the ring as previously described.

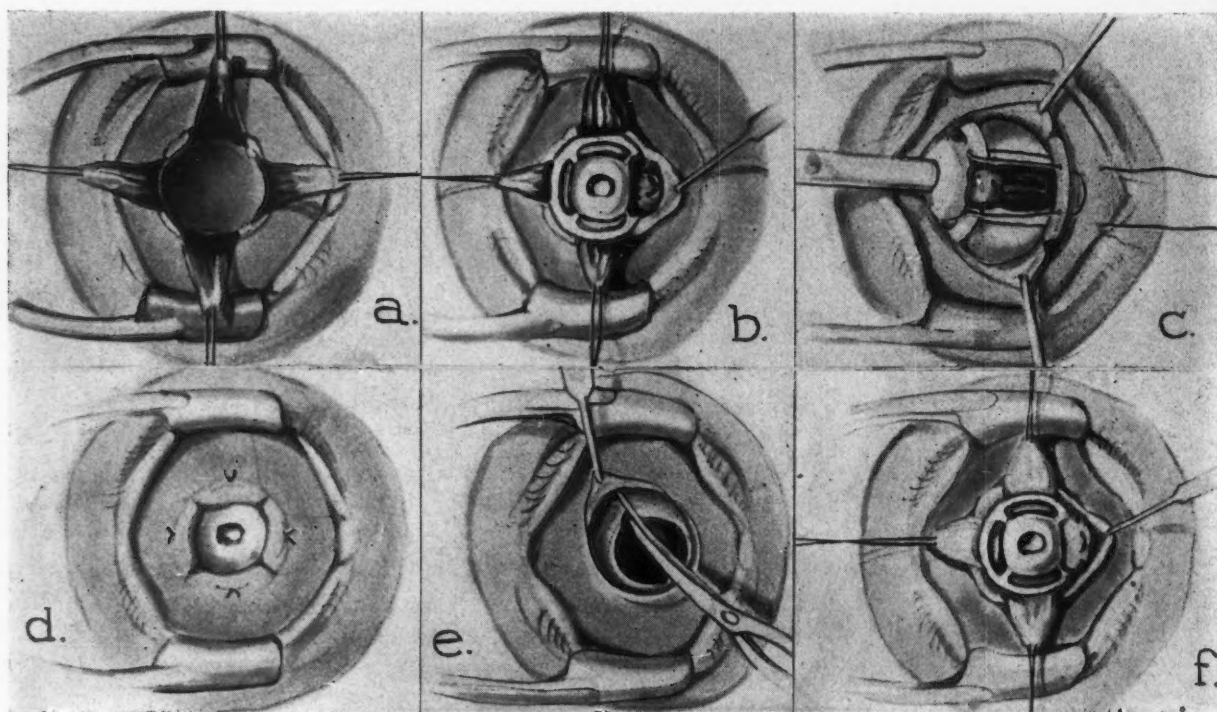


Fig. 2.—(a) Socket after operation, showing four recti muscles; (b) ball and ring implant in place. One rectus muscle has been sutured over the ring with nylon; (c) shows arrangement of silk suture to hold conjunctiva and Tenon's capsule over the ring. Incisions have been made in conjunctiva and Tenon's capsule to allow for the spokes; (d) sutures have been tied. Reconstruction of old socket; (e) conjunctiva and Tenon's capsule have been separated. Incision is being made in Tenon's capsule to produce four slips; (f) each slip of Tenon's capsule is sutured over the ring with nylon, similar to the treatment of the muscles in (b).

snare, to diminish postoperative bleeding. An incision is made through Tenon's capsule and conjunctiva in the four corners between the recti muscles, so that these tissues can be carried over the ring between the spokes. The implant is placed in Tenon's capsule and held there by means of a plastic pin, 4 cm. long, which fits into the depression in the anterior face. A double-armed, heavy, silk suture is passed through the conjunctiva and Tenon's capsule about 2 mm. from the free border, as illustrated in the diagram (Fig. 2 c). The ends are carried over the ring and then brought out through Tenon's capsule and conjunctiva about 7 or 8 mm. behind the free border. The ends are not tied until later. The single-armed, silk suture through the cut end of the rectus is then pulled taut and a 000 nylon suture is passed several times through the belly of the muscle. This suture can be more securely placed before the muscle

The patient is allowed up in one or two days, and the dressing is changed on the third or fourth day. The silk sutures are not removed until the end of the third week, although the patient may be ready for a fitting of the artificial eye sooner than this. The time for fitting is judged from the amount of postoperative oedema.

Postoperative results in 24 cases.—Eighteen implants were inserted at the time of the original enucleation, and 6 in patients whose eye had been removed some time before. In 2 of this latter group, the eye had been removed 16 and 15 years previously, but the

muscle stump showed good movement and the final prosthetic motility was satisfactory. The average motion obtained with the prosthesis when the ball and ring implant was used, is shown in Tables I and II.

TABLE I.

PROSTHETIC MOVEMENT OBTAINED USING BALL AND RING AT THE TIME OF ENUCLEATION

Direction of gaze	Average degrees of movement
Nasally	33
Superiorly	33
Temporally	32
Inferiorly	27

TABLE II.

PROSTHETIC MOVEMENT OBTAINED USING BALL AND RING IN SOCKETS SOME TIME AFTER ENUCLEATION

Direction of gaze	Average degrees of movement
Superiorly	29
Nasally	28
Inferiorly	28
Temporally	23

Complications.—One patient developed orbital cellulitis nine months after operation. She was hospitalized for ten days and the swelling subsided under intramuscular penicillin treatment. In another patient the socket was scarred following removal of the eye two years previously because of a hand grenade explosion. Two weeks after the implant was inserted, conjunctiva and Tenon's capsule retracted over the upper part of the ring. Later attempts to replace these tissues were unsuccessful; however, the implant has not extruded and the prosthesis still shows good movement.

CONCLUSIONS

1. The basket implant operation is superior to older methods. The prosthetic movement is more spontaneous and of greater range than that obtained with no implant, or with a ball implant. Later complications are unlikely because the implant is covered with Tenon's capsule and conjunctiva.

2. In contrast to use of basket in original cases, the results obtained when the basket implant is used in sockets where the eye had been removed some time before is not satisfactory. It is not necessary to have a custom-made eye with a stud, as good movement can be obtained with a stock eye, and if convenient, a stud can be fitted later.

3. The range and spontaneity of movement of the prosthesis with the ball and ring implant is

even better than with the basket type. Best results are obtained when this implant is used at the time of the original enucleation, but satisfactory results can be obtained when used in sockets where the eye had been removed some years before.

SUMMARY

Two newer types of implants used after enucleation have been described—namely, the basket and ball and ring. The results using these implants in 36 cases are given. The surgical technique using ball and ring implant is outlined.

The author expresses his appreciation to Dr. A. Lloyd Morgan for many helpful suggestions regarding surgical technique.

The above series includes several cases from the practices of Dr. A. Lloyd Morgan, Dr. A. J. Elliot, and Dr. W. R. F. Luke, with their kind permission.

The implants and artificial eyes were made at Brent Laboratories, 62 Avenue Road, Toronto.

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A NEW PARASYMPATHETIC STIMULANT —ETHYL 3:3 DIMETHYLALLYL BARBITURIC ACID*

1. Its Effect on Gastric Secretion

C. M. Ballem, M.D.,
R. L. Noble, M.D., Ph.D., D.Sc.† and
D. R. Webster, M.D., Ph.D., F.R.C.S.[C.]

Montreal, Que.

DURING the war extensive investigations were conducted on the use of barbiturates to control motion sickness.¹ It was found that certain derivatives exerted a protective action presumably by a central effect and that this was not necessarily related to the hypnotic or anæsthetic power of the barbiturate.² Since the object of these experiments was to find if such a class of compounds might affect other actions of the nervous system a number of tests were made on gastric function. As has been pre-

* From the Department of Experimental Surgery, McGill University, Montreal.

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† Now in Department of Medical Research, University of Western Ontario.

viously reported by one of us (R.L.N.) two barbiturates ethyl 3:3 dimethylallyl barbituric acid (No. 16-A*) and ethyl 1:3 dimethyl-1-butenyl barbituric acid (No. 21-A) were found to be powerful stimulants of gastric secretion in cats.³ Another compound (1-methylbutyl) ethyl acetyl thiourea (24-A) was found to inhibit the gastric secretion which normally follows the central stimulation caused by the hypoglycæmic action of insulin.⁴ This substance also inhibited the stimulating action of No. 16-A. Although it was suggested that the effects of these compounds could be explained by a central action it was essential to continue and extend these observations. The present paper concerns further studies on the effect on dogs of compound 16-A.

Methods.—Twelve dogs with gastric fistula were used, three having their vagi destroyed previous to use of drug. In two, vagotomy was performed after control experiments. Except where otherwise stated the dogs were unanæsthetized, and fasted for approximately 24 hours. Every possible effort was made to prevent any psychic secretion, by first of all the experimenter never feeding dogs, and secondly tests being carried out in a separate room, where the dogs were never fed or handled. The stomach was washed with water, and drained thoroughly before beginning the experiment. Gastric secretion was collected continuously, with control periods of varying intervals to ensure that the gastric glands were quiescent. The drug was dissolved in water and injected subcutaneously. The volume of gastric juice was measured and the pH estimated by using a Beckman pH meter, and pepsins were estimated by Le Veen⁵ method. When the blood sugar levels were calculated the Folin-Wu⁶ method as adapted to Evelyn photocolormeter was used. Although in these experiments the drug was always used subcutaneously it is also effective orally.

Results.—The results of this investigation are reported under the following headings: (1) Effect on gastric secretion. (2) Site of action of drug. (3) Other actions of 16-A.

1. *Effect of 16-A on gastric secretion in normal dogs.*—The dosage of the drug used varied usually between 3 and 4 mgm./kg. subcutane-

ously. To demonstrate this effect 9 normal fistula dogs were used, and 20 administrations of the drug given. The following are examples of results obtained:

Dog No. 26, 36 kg. 16-A 4 mgm./kg. subcutaneously at 1045 hrs.

GASTRIC SECRETION			
Time	Vol.	pH	Pepsin units/c.c.
0930 - 1000	6.0 ml.	1.79	1,803
1000 - 1030	9.0 ml.	4.10	
1030 - 1045	3.0 ml.	4.10	
1045 - 1115	13.0 ml.	3.87	
1115 - 1145	205.0 ml.	1.27	4,633
1145 - 1215	257.0 ml.	1.40	8,625
1215 - 1245	175.0 ml.	1.45	88,318
1245 - 1315	92.0 ml.	1.24	
1315 - 1345	45.0 ml.	1.08	279,188

Dog No. 33, 24.5 kg. 16-A 4 mgm./kg. subcutaneously at 0950 hrs.

GASTRIC SECRETION			
Time	Vol.	pH	
0830 - 0930	1.0 ml.	neutral	
0930 - 1000	10.0 ml.	5.95	
1000 - 1030	76.0 ml.	1.80	
1030 - 1100	66.0 ml.	1.52	
1100 - 1130	70.0 ml.	1.81	
1130 - 1200	22.0 ml.	1.47	

The above results on pepsin are representative of several experiments since as the secretion becomes less, pepsin values rise. Whether this is due to a dilution or a psychic factor is not clear.

This drug is a very potent stimulus of gastric secretion. An idea of just how potent may be obtained by comparing results of 16-A and insulin induced secretion.

Dog No. 28, 24.5 kg. Insulin induced secretion. Fasting gastric secretion collected for ½ hr. control period, then 8 units insulin given intravenously at 0945 hrs.

GASTRIC SECRETION			BLOOD SUGARS	
Time	Vol.	pH	Time	Mgm. %
0915 - 0945	1.0 ml.	3.98	0940	82.5
0945 - 1015	10.0 ml.	3.48	1015	41.0
1015 - 1045	27.0 ml.	1.07	1045	47.0
1045 - 1115	12.0 ml.	1.20	1115	64.0
1115 - 1130	4.0 ml.	1.11	1130	65.0

In all these experiments, visible mucus was present in every sample. For results with 16-A see Dog No. 28, Section 2.

2. *Site of action of drug.*—(a) In view of the similarity between the effect of this drug and that of insulin hypoglycæmia, on gastric secretion, it was conceivable that it might cause its effect by lowering of blood sugar. This however was found not to be the case as is shown by the following experiments.

* Compounds Nos. 16-A, 21-A, and 24-A were prepared and kindly supplied by the Lilly Research Laboratories, Eli Lilly & Company.

Dog No. 40, 30 kg. Fasting gastric secretion collected for 1 hr. Fasting blood sugar collected at 1015. Then 16-A 3 mgm./kg. subcutaneously at 1020 hrs., and blood sugars estimated at ½ hr. intervals.

GASTRIC SECRETION			BLOOD SUGARS	
Time	Vol.	pH	Time	Mgm. %
0930 - 1000	.... 4.0 ml.	4.30		
1000 - 1020	.... 8.0 ml.	7.60	1015	85.5
1020 - 1050	.... 12.0 ml.	7.40	1050	78.5
1050 - 1120	.... 53.0 ml.	1.75	1120	85.0
1120 - 1150	.... 73.0 ml.	1.38		
1150 - 1220	.... 64.0 ml.	1.34		

Dog No. 28, 24.5 kg. Fasting gastric secretion collected for 1 hr. Fasting blood sugar collected at 0920 hrs. Then 16-A 3 mgm./kg. injected subcutaneously at 1000 hrs. Blood sugar estimated at ½-hr. intervals.

GASTRIC SECRETION			BLOOD SUGARS	
Time	Vol.	pH	Time	Mgm. %
0900 - 0930	... 35.0 ml.	Acid		
0930 - 1000	... 6.0 ml.	"	0920	93.0
1000 - 1030	... 22.0 ml.	"	1030	115.0
1030 - 1100	... 160.0 ml.	"	1100	84.0
1100 - 1130	... 145.0 ml.	"	1130	115.0
1130 - 1200	... 55.0 ml.	"		

(b) Effect on gastric secretion following vagotomy:

Dog No. 39, 23.6 kg. Experiment previous to operation. Fasting gastric secretion collected for 1 hr. period. Then 16-A 3 mgm./kg. injected subcutaneously at 1020 hrs.

GASTRIC SECRETION		
Time	Vol.	pH
0920 - 1020	..... 5.0 ml.	2.16
1020 - 1050	..... 2.0 ml.	6.97
1050 - 1120	..... 39.0 ml.	1.42
1120 - 1150	..... 62.0 ml.	1.11
1150 - 1220	..... 51.0 ml.	1.10
1220 - 1250	..... 40.0 ml.	1.00
1250 - 1320	..... 40.0 ml.	1.02
1320 - 1350	..... 63.0 ml.	0.98

Dog No. 39, 24 kg. Supradiaphragmatic vagotomy done, and after a satisfactory preoperative period, 16-A 3 mgm./kg. injected subcutaneously at 1030 hrs.

GASTRIC SECRETION		
Time	Vol.	pH
1000 - 1030	..... 2.0	4.23
1030 - 1100	..... 2.0	4.18
1100 - 1130	..... 2.0	alkaline
1130 - 1200	..... 2.0	7.82
1200 - 1230	..... 2.0	alkaline
1230 - 1300	..... 2.0	neutral

In four more dogs, similar results were obtained in 6 experiments. The vagi in these experiments had been destroyed by electrodes. This nerve destruction was confirmed by extreme gastric retention present 24 hours after feeding, and no gastric secretion following insulin hypoglycemia. In these cases an insulin test was not considered satisfactory unless the blood sugar fell to below 50 mgm. %.

2. (c) *Prevention of 16-A induced gastric secretion by use of tetra ethyl ammonium chloride* ("Etamon", Parke-Davis & Co.).—Insulin induced gastric secretion can be prevented by etamon. This blockage appears to take place at the junction of pre- and post-ganglionic neurons.⁷ For control experiment without etamon, see Dog No. 33, Section 1.

Dog No. 33, 24.5 kg. Dog fasting only 16 hrs. and intestinal phase of gastric secretion still occurring. Gastric secretion collected for ½-hr. period then 16-A 3 mgm./kg. given subcutaneously at 0930 hrs. Etamon 10 mgm./kg. intravenously at 0950 hrs.

GASTRIC SECRETION		
Time	Vol.	pH
0900 - 0930	..... 18.0 ml.	1.39
0930 - 1000	..... 2.5 ml.	1.52
1000 - 1030	..... 2.0 ml.	5.41
1030 - 1100	..... 4.0 ml.	7.91
1100 - 1205	..... 13.0 ml.	8.23

2. (d) *Prevention of 16-A induced gastric secretion by nembutal anesthesia*.—Three such experiments were carried out on different dogs. The following is an example of such an experiment:

Dog No. 40, 30 kg. For control experiment with 16-A only, see under section (2a). Fasting gastric secretion collected for ½-hr. period. Nembutal 25 mgm./kg. intravenously at 0930 hrs. Then 16-A 3 mgm./kg. subcutaneously at 1000 hrs.

GASTRIC SECRETION		
Time	Vol.	Acidity
0900 - 0930	..... 5.0 ml.	weakly acid
0930 - 1000	..... 0.0 ml.	
1000 - 1030	..... 0.0 ml.	
1030 - 1100	..... 0.0 ml.	
1100 - 1130	..... 0.0 ml.	
1130 - 1200	..... 0.0 ml.	

To summarize.—Gastric secretion induced by 16-A does not result from lowering of the blood sugar; vagotomy prevents this secretion; blockage of parasympathetic by etamon prevents secretion as does nembutal anesthesia. These facts all show that 16-A activates gastric secretion via the parasympathetic nervous system. It appears to act centrally, further observations seem to place this effect on the hypothalamus.

3. *Other effects of 16-A*.—In addition to stimulating gastric secretion marked stimulation of the salivary glands occurs. So marked is this secretion that the dogs drool saliva from the mouth, swallow frequently, and in addition to these findings it has been noted that 3 mgm./kg. causes a prominence of the nictitating membranes, paralysis of the pupil in semidilatation, the pupils not reacting to light. If 4 mgm./kg. are given this paralysis of the nictitating mem-

branes becomes more marked so that nearly half the eye is covered, both eyelids are weakened, and endophthalmus develops. This picture usually begins about 20 minutes after injection, approximately ten minutes before gastric secretion commences, and usually lasts for one hour. These findings would suggest a sympathetic paralysis.

This drug also appears to cause symptoms of stimulation and in doses of 4 mgm./kg. the dogs are quite restless, whining, and moving in their stands. Involuntary micturition and defaecation sometimes occur. In addition to the above effect, 5 mgm./kg. usually results in marked excitement, continuous barking, and biting at any object within reach, weakness is very marked and if dogs are not restrained they will run about wildly, with a marked staggering gait.

SUMMARY

1. Sodium ethyl 3:3 dimethylallyl barbituric acid is a powerful stimulant to gastric secretion. It strongly stimulates acid and mucus cells but apparently acts as only a weak stimulant to peptic cells.

2. Its action is central, and is prevented by vagotomy, etamon, and nembutal anaesthesia.

3. There is also an apparent paralysis of the nictitating membrane and reaction of the pupil suggesting a depression of sympathetic function. Larger doses are followed by symptoms of excitement, and inco-ordination.

The authors gratefully acknowledge the advice and criticism of Prof. B. P. Babkin.

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In India, a million acres of safflower are grown each year. The thistle-like flower is used to make a yellow dye, the leaves are used in salads, and oil from the seeds as food and in paint.

THE NEUROGENIC ORIGIN OF BLADDER SYMPTOMS FOLLOWING PROCTECTOMY*

I. B. Macdonald, M.D. and
C. Aberhart, M.D. M.S.

Toronto, Ont.

OF recent years clinicians have become increasingly aware of bladder dysfunction following radical resection of the rectum. Whipple¹ reported in 1932 that half of his cases of abdomino-perineal operations were followed by cystitis, but he did not mention any urinary functional impairment. Hill, Barnes and Courville² by means of cystograms produced excellent evidence that the postoperative difficulties were neurogenic in origin. Their findings showed that the bladder was passively distended owing to atonicity of its musculature. An interesting cystogram in one case revealed that the trauma to the nerve fibres to the bladder was more severe on one side than on the other, as evidenced by the greater prominence of one side of the vesical dome.

On the other hand, Collier and Eastman³ state that "abdominal-perineal resection of the rectum destroys neither the autonomic nor the somatic nerve supply to the bladder". They based their conclusions on a comparison of pre- and post-operative cystometrograms and believed that the urinary retention after this operation was probably due to "local trauma and reflex inhibition".

The diversity of opinion regarding these urinary complaints shows that the causative mechanism is by no means clear. No one explanation has been generally accepted. Part of the reason for this persisting problem must undoubtedly be that bladder neurophysiology and the mechanism of micturition are not well understood.

Both during and following the war, one of us (C.A.) has been responsible for the genito-urinary care of 153 paraplegics. A considerable number of these cases have required trans-urethral resections of their bladder necks for vesical urinary retention, and as a consequence we have become familiar with the cystoscopic appearance of the bladder neck and posterior urethra in paraplegic patients. Because of this added experience it was felt that cystoscopic

* From the Department of Surgery, Toronto General Hospital.

examination of patients who had had abdomino-perineal resections performed at least one year previously, might add some information as to the cause of the frequent urinary complications. Observations were carried out on twelve male patients. Seven different general surgeons from the public wards of the Toronto General Hospital had been responsible for these operations.

Eleven of the twelve resections were performed for carcinoma of the rectum, and one for ideopathic ulcerative colitis and proctitis. The ages of the patients varied from 40 to 77 years; only four being under 60 years of age, so that, the majority were in an age group where prostatic enlargement might be expected. Eight patients had no preoperative urinary symptoms. Three had nocturia varying from once to twice, while the remaining patient voided four to five times each night because of an old gonorrhœal stricture.

Nine patients had retention urethral catheters immediately postoperatively for an average of one week to ten days, and two more were catheterized repeatedly as they were unable to void at all. The youngest case (40 years) only required a retention catheter for a few hours after his operation and on its removal was able to void normally and has continued entirely free of urinary complaints for four and a half years after excision of his rectum for ulcerative proctitis.

With the exception of this last case, all patients had either retention with cystitis and required straining to void, or incontinence and frequent dribbling. Only two cases were cystoscoped while still in hospital postoperatively. Ten ounces of residual urine found in each case was reported to be due to "neurogenic bladder" rather than prostatic obstruction.

RESULTS

All the patients have been questioned very closely regarding their present urinary functions. Two patients only were entirely free of bladder symptoms. The remainder had symptoms varying from slight straining to initiate micturition, to marked urgency, severe straining and diminution of urinary stream associated with dribbling on completion of micturition with a sensation of incomplete bladder emptying. The amounts of residual urine varied from none in one case to fifteen ounces as maximum in another. Most patients had a

residual of one to three ounces. Strangely enough, the volume of bladder urine, removed by the cystoscope following micturition, did not have any particular bearing on the severity of urinary symptoms.

The bladder neck and posterior urethra in one of the twelve cases on whom cystoscopy was performed, could not be visualized adequately because of gross prostatic enlargement. The remainder of the cases revealed a widely gaping bladder neck with the sides of the vesical orifice flattened out laterally. The posterior urethra was shortened markedly but was also widened appreciably in the antero-posterior and lateral planes, thus causing the verumontanum to lie in very close proximity to the bladder neck. In addition to these findings ten patients had a very noticeable hollowing of the posterior urethral floor between the verumontanum and the bladder neck.

The forty-year old ulcerative colitis and proctitis case who has been entirely asymptomatic since the excision of his rectum, also showed a similar picture through the cystoscope. All cases had varying degrees of trabeculation of the bladder wall, the severity of which would appear to be proportional to the bladder symptomatology.

The exact similarity between the bladder neck and posterior urethra in a paraplegic and a postoperative case of abdomino-perineal resection of the rectum has led us to the conclusion that these latter cases undoubtedly suffer from a paralyzed bladder neck. In none of the patients examined did we feel that the bladder was in a retroverted position due to absence of its posterior rectal support. The bladder neck deformity observed in all but one case was strictly neurogenic and not mechanical in origin.

SUMMARY

1. Cystoscopic examinations were carried out on twelve patients at a considerable time after abdomino-perineal resection of the rectum.
2. The cystoscopic appearance of the bladder neck and posterior urethra of these patients was identical with that of paraplegics.
3. The bladder neck lesion following radical proctectomy is neurogenic in origin.

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- 1012 Medical Arts Bldg.

PSYCHOLOGY IN MODERN INDUSTRY*

Robert B. Malmø, Ph.D.

*Allan Memorial Institute of Psychiatry,
Montreal, Que.*

I WISH to call your attention to what I consider to be the two strongest trends in industrial psychology today. The first represents an extension of aptitude testing. The second trend takes us into the field of social psychology. As a former teacher of mine² was wont to point out, the conception of specialized aptitudes and the desirability of having tests of behaviour which will indicate in advance latent capacity, is very ancient. It appears repeatedly, for example, in Plato's *Republic*. Plato seems to have regarded it as of considerable importance in the conduct of an ideal state. In Book II we find Socrates leading the dialogue as follows:

"Really, it is not improbable: for I recollect, myself, after your answer, that, in the first place, no two persons are born exactly alike, but each differs from each in natural endowments, one being suited for one occupation and another for another. Do you not think so?" "I do."

"... From these considerations, it follows that all things will be produced in superior quantity and quality, and with greater ease, when each man works at a single occupation in accordance with his natural gifts. . . .

"But we cautioned the shoemaker, you know, against attempting to be an agriculturist, or a weaver or a builder besides, with a view to our shoemaking work being well done; and to every artisan we assigned in like manner one occupation; namely, that for which he was best fitted. . . . Now is it not of the greatest moment that the work of war should be done well? Will it not also require natural endowments suited to this particular occupation?"

"Then, apparently, it will belong to us to choose out, if we can, that special order of natural endowments which qualifies its possessors for the guardianship of the state."

"Certainly it belongs to us."

"Then, I assure you, we have taken upon ourselves no trifling task."

Following this, Plato proposes as a means of accomplishing the task, that persons being considered for military profession shall be given "actions to perform" which shall test the retentiveness of their memories, their power of resistance to deceptions, of resistance to timidity and fear in terrifying situations, and to the seductions of pleasure. Thus we find Plato sketching forth very definitely a set of tests for military aptitude. Some twenty-three

hundred years later the dream conceived by the Greek genius was realized in United States army mental tests. Such is the halting course of progress.

World War II gave aptitude testing another boost. The advances were in the direction of refinements of test construction, and in methods for improving test batteries. There was also a greater development of tests for industry on the home front. In the United States, during the war, Shartle and his group on the War Manpower Commission⁴ were responsible for marked advances in the field of aptitude testing. Aptitude-test batteries were developed for about 170 occupations and were used in Employment Service offices to aid interviewers in selecting the most satisfactory beginners to be referred for training on a job or in a training course.

Emphasis in the work on the development of aptitude-test batteries was naturally placed on those occupations which were important in the war effort. Batteries were developed for occupations such as explosive operator, aircraft riveter, are welder, precision lens grinder, radio transmitter assembler, machinist, sheet metal work, power sewing machine operator, and power press operator.

Before an aptitude study was carried out, a preliminary survey was made. Such a survey included the making of a job analysis; estimation of the worker characteristics involved in the job; the collection of personnel information such as the number of workers employed, and the age, education, and length of experience of the workers; a determination of whether the work performed by the different workers was comparable; and a determination of possible criteria that might be used as measures of job proficiency. When this preliminary information indicated that conditions were favorable for the conduct of an aptitude study, the following steps then ensued. (1) Tests were given to workers or trainees. (2) The data were analyzed statistically in order to select the best combination of tests, and to provide norms. (3) After the battery had been put into use as a selection device, follow-up data were collected to determine the effectiveness of the battery in selecting the most satisfactory beginners for referral to job openings.

In order to be really effective, a test battery had to be made to conform to the requirements

* Address given at the conjoint conference of the Industrial Medical Association of the Province of Quebec, and the Ontario Industrial Medical Section, October, 1947.

of a specific job. This meant (1) job analysis, (2) special test construction, and (3) testing the tests.

This work has not flooded the market with a lot of new tests which may be directly applied to industries here and elsewhere. But the work represents advance in methodology which is of great advantage to the industrial psychologist who is attempting to provide adequate test batteries for a particular industry. In order to achieve a test battery which will be really effective in a particular industrial set-up, the tests must usually be custom made. This is a big job, but one which, well done, will produce good results. For final judgment about the effectiveness of such a program these questions must be asked: (1) Has quantity of production increased? (2) Has rate of turn-over decreased? (3) Has absenteeism declined? (4) Are there fewer accidents on hazardous jobs? All of these criteria are important to management. The last two, of course, are of particular importance to the industrial physician and his insights into the reasons for the sickness or the accident in all the psychosomatic aspects of the case are of the utmost importance from the psychological point of view.*

The second major trend in present day industrial psychology, as I have said, takes us into the field of social psychology, and really comes closer to the classical conception of scientific procedure than does aptitude testing. One of the most significant historical developments in the organized investigation of industrial problems came about in England when the Industrial Health Research Board was formed, (called at first, Industrial Fatigue Research Board). Scientists like Greenwood, Bedford, and Vernon applied their methods to investigating factors affecting the health and safety of workers in the industrial situation. Vernon's book on *Accidents and Their Prevention*⁵ is a model of scientific analysis, and scientific reasoning based on results of many carefully

* It should be emphasized that the aim is optimal *placement* of workers, and not merely *selection*, in the sense of excluding men who are "unfit". A man who is "unfit" for one job will usually be well suited to another. Only when one pivots on the job, does the selective aspect appear prominent. In human engineering, it is necessary to consider the problem from the point of view of the foreman whose team must be well suited to the particular job. It is just as essential, however, from the broader point of view to consider the man, his aptitudes and personality so that he may be *placed*. This is vocational advisement.

conducted investigations by himself and his co-workers.

The investigators on the old Industrial Research Board were primarily interested in the effects of such environmental factors as temperature, humidity, and lighting upon human health and efficiency. A typical title from those early days was "An Experiment in the Lighting of Jute Mills". The point is that these workers brought the methods of scientific observation and analysis to the industrial scene. Their laboratory was the jute mill or the weaving shed, and they conducted experiments there, *without* seriously interfering with production and, I might add, without exhausting the overseer's patience.

Now, we have seen many extensions of these early studies. The most recent advance along the line of scientific investigation carried out in the plant has come in the study of the relations between the worker in his social (as distinguished from his physical) environment. The same sort of careful scientific investigation which was originally carried out in studying lighting and ventilation has now been, and is being, applied to such things as worker teams, and to informal leadership of such teams in the industrial setting. Professor Mayo is a pioneer in this field and his work is being carried on now at Harvard by Dr. Roethlisberger. Closely related researches are now in their initial stages at the Massachusetts Institute of Technology.

There is not time for us here to go into the details of these studies. The main points are that they were carefully planned, and executed in accordance with the principles of scientific procedure, and that the data were treated critically so that valid conclusions could be drawn.

From *Management and the Worker* comes the following exposition.

"The point of view which gradually emerged from these studies is one from which an industrial organization is regarded as a social system. . . . Just as each employee has a particular physical location, so he has a particular social place in the total social organization. As patterns of behaviour become crystallized, every object in the environment tends to take on a particular social significance. . . . According to this way of looking at things, material goods, physical events, wages, hours of work, etc., cannot be treated as things in themselves. Instead they have to be interpreted as carriers of social value. . . . The function of management, stated in its most general terms, can be described as that of maintaining the social system of the industrial plant in a state of equilibrium such that the purpose of the enterprise are realized. Overt or verbal behaviour

at work was no longer regarded as the effect of simple cause (fatigue, monotony, or supervision) but as the resultant of the interaction of a number of variables making for or against equilibrium."

This view of an industrial organization as a social system has had a profound influence on present day investigators in the field of industrial psychology. Coming as it does in an era when psychiatry is becoming ever more conscious of social forces in the shaping of personalities, there is the promise of integration of various avenues of approach to the problems of industry.

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PROBLEMS IN THE TREATMENT OF CARCINOMA OF THE RECTUM*

Campbell Gardner, M.D., C.M., F.R.C.S.[C.],
F.R.C.S.(Edin.), F.A.C.S.

Montreal, Que.

TO those who have been interested in proctology for any length of time, everything which I will say will be already known, but it would seem from a study of some of the cases which have fallen into our hands after operation, or after listening to some of the discussions which occur between surgeons of considerable experience, that some of the phases of the treatment of carcinoma of the rectum are not yet completely mastered. It seems wise therefore that the problem be aired in order that perhaps, some solution of these difficulties may be found.

Possibly one of the reasons why these problems have arisen in Canada is that there is no well established proctological centre such as St. Mark's Hospital in London, England, where only rectal disease is treated, nor is there a surgeon or group of surgeons similar to Drs. Jones, Babcock and Bacon who interest themselves primarily in this disease. Consequently, it falls to the lot of the general surgeon to handle two or three such patients a

year and, unfortunately, in the average textbook, or even in the average article, great stress is laid upon the good results of this or that treatment and insufficient stress on the complications and difficulties which occur, with the result that the average surgeon is likely to feel that his failures are due to his own technical inability and not to any defect in the treatment itself, and consequently he in turn, for fear of ridicule, fails to mention these very complications.

Although this paper is concerned primarily with treatment, it is hardly possible to pass over the problems encountered in diagnosis. When a man like Jones publishes a paper describing 500 or more cases of cancer of the rectum, all of which have been treated by various doctors for a period of six months or more before the diagnosis is finally made, it would seem to put the finger on the main problem of this disease, the problem of diagnosis. Practically all of these patients consult their family physician complaining of bleeding from the rectum. Practically all have been told that they have hæmorrhoids and practically all have gone away feeling secure, as the deadly disease continues to grow steadily.

It is useless to encourage the public to see a doctor at the first sign of anything abnormal and on the other hand, to fail to train the physician to diagnose the disease. With the progressive time reduction of the curriculum in surgery, at least in some universities, it becomes almost impossible to train men going into general practice in the use of the sigmoidoscope. Yet, an adequate sigmoidoscopic examination can be done in anyone's office, as we well know, and in this way 90% of these diagnoses would be made at the first visit.

My first plea then is to those of you who are responsible for teaching general surgery in universities throughout this country to make the student "rectum-conscious" and to be sure that no one graduates in medicine unless he is able to do an adequate rectal and sigmoidoscopic examination. The second problem in diagnosis rests in its establishment pathologically. I have many times seen rectal polyps touched with the diathermy and have shuddered to think of the possibility that they might be malignant. The excuse is usually given that there is danger of hæmorrhage in removing a rectal growth some distance from the anus. Every reasonable

* Read before the Royal College of Surgeons of Canada, November, 1947.

hospital or diagnostic centre should be equipped with a rectal snare. In this way any growth or piece of growth can be removed safely from the rectum without fear of hæmorrhage and the diagnosis and prognosis will then be definitely established by the pathologist.

OPERABILITY

Having established that the disease to be treated is actually carcinoma of the rectum the next question is whether or not it is operable. In this regard, when anyone considers mortality rates or cure rates, one must insist that operability rates are produced at the same time. It is quite easy to lower one's mortality figures to almost zero and to lift one's ten-year cure to 80% providing one selects only those patients in good general condition with the Broder-Duke's pathological classification of A-1.

This, then, is the second plea that I will make, which is for a more careful assessment of operability with the clear understanding that one's mortality rate will be raised and one's cure rate lowered.

More recently we have felt that even invasion of the bladder and prostate are not insuperable obstacles to cure. Combining with the genito-urinary department we have resected the posterior wall of the bladder and have reimplanted the ureters into the stump of the bladder left, reconstructing it as best we can. We are prepared, if necessary, to reimplant the ureters into the bowel or skin and resect the whole bladder and prostate in addition. We believe that the end results of this procedure are less fearful than those of the intolerable pain when bladder and prostatic metastases occur. If metastases are already present in the liver and if these are small we do not feel that this is a contraindication to resection. Many patients live for many months after this has occurred. If we can spare them the pelvic pain, we feel that, if they are clearly aware of the dangers of operation, this should be done.

Regarding the operation itself, we, as a general rule, favour a one-stage, two team, abdominal-perineal excision. Too often adhesions form following the first stage rendering the second very difficult. Our former fear of ensuing peritonitis is now largely combated by the use of sulfadiazine and streptomycin used for one week preoperatively, rendering the

bowel almost sterile, as has been set forth by Dr. Harry Morton in a previous paper.

It is felt that there are two situations where the operation might be separated into two stages. First when a patient is admitted with acute obstruction, where there has been no chance to sterilize the bowel and where the operation very frequently has to be done at night, yet where the diagnosis is readily established. A preliminary Devine type of colostomy is recommended. The second condition arises when the bladder or prostate are definitely involved and where it is desired to resect some portion of them. In both these cases it is believed that if the sigmoid is divided, the proximal end brought out as an inguinal colostomy and the distal end in the midline, as in the Lahey operation, subsequent operation is facilitated.

In all other cases we have adopted the procedure or modifications of it which I will now describe. Previously the Miles abdominal-perineal resection was used, but too often it was found difficult to push a large tumour down into the pelvis from above and close the peritoneum over it, or, worse, after the abdominal stage had been completed, the patient was turned, shock ensued, even to the point of death. Sometimes too, when the pelvic part of the operation was being performed one wished that if only one could look once more into the abdomen, one might be able to stop troublesome bleeding which was apparently coming from above or perform some other similar small task which was very difficult from below.

In 1939, Drs. Nauton Morgan and Lloyd-Davies repopularized the positioning of the patient in a semi-lithotomy Trendelenberg position. This position had been used by surgeons before, by Devine for one in 1931, but it is believed that they were the first to make use of it by having two teams work synchronously. Dr. Martin and I saw them do their first few cases. In their hands the method was amazingly successful. The operation was completed in far less time, the shock to the patient was much less and the ability of the surgeons to see the full extent of their dissection at the same time rendered the operation more thorough, and the delivery of large tumours was made relatively easy. Furthermore, the strain on the individual surgeon was greatly reduced and it has seemed extraordinary to us that this combination of Miles' original operation and

Gabriel's perineal abdominal resection has not been more widely used in the United States and in this country. We well remember the horror with which even such a distinguished surgeon as Dr. J. A. MacFarlane first greeted our performance of such an operation overseas.

I have no intention of going into the detail of this procedure; suffice it to say that it is exactly the same as a combination of the two procedures before mentioned. All the extra equipment required is a pair of stirrups which can be set at a 40° angle from the table with the legs well abducted. When Dr. Martin and I originally performed this operation, our tendency was to have the legs at too steep an angle and not sufficiently abducted. This interferes with the abdominal operator, but if the position is modified as suggested, I believe that no abdominal surgeon will feel that he is in any way hampered. At the present time, with the effort which is being made to preserve the rectal sphincters, the use of this position is doubly enhanced.

Our attempts at conservative resection have been very limited in number. It has been felt that if a tumour such as a large polyp or very small and early carcinoma is situated some distance from the anal margin, wide resection, followed by an intrapelvic anastomosis may be the best attack. If, on the other hand, we find either before or at operation that the tumour is nearer the anal margin than we suspected, the rectum can be divided to within one inch of the anal margin, the rectum, and lower sigmoid excised and the descending colon and upper sigmoid mobilized, passed out through the anus, the remaining terminal inch turned down like a cuff and anastomosis done by the lower team outside the anal orifice, in accordance with the technique laid down by Gabriel for complete prolapse of the rectum. Drainage will then be instituted by the lower team, posterior to the anal sphincter.

My third plea then is for the use of two teams working simultaneously in the operative treatment of carcinoma of the rectum.

POSTOPERATIVE PROBLEMS

This paper cannot be terminated without discussion of the problems encountered postoperatively. Many of these mentioned in textbooks have been largely eliminated in the last few years. Haemorrhage, intestinal obstruction, peritonitis, perineal wound infection and

paralytic ileus are all now more or less controlled by means of adequate blood transfusion, antibiotics and the Levine or Miller-Abbott tube. Certain problems remain of which the most important would seem to be bladder control and despite all efforts made, it is found that the bladder still bothers us in about 50% of cases. Many reasons are given for this; (1) that the rectum is removed too close to the sacrum; (2) that the bladder sags afterwards into the rectal space; (3) that the nerve supply to it is interfered with; and so on. Be this as it may, we have been trying to correlate the type of operation which is done with subsequent bladder disturbance and have not yet successfully done so.

We are studying this problem with the genito-urinary department by having cystometrograms done before and after operation and making more detailed notes at operation as to whether we are taking a little more tissue behind or in front or at the sides, in an attempt to find an answer to this problem.

Impotence, a problem rarely stated, or dismissed in a line or two, occurs in 95% of our cases and, if not explained to the male patient before operation, may lead to very troubling scenes thereafter. No answer has been found for this. The care of the colostomy is too often shrugged off with a few words and the patient is left to fend for himself as best he can, or is provided with a complex and expensive apparatus which cannot but place the whole treatment of carcinoma of the rectum in a most unfavourable light.

Following the first two or three months and with a little attention to diet, the average patient's colostomy will work only once every two or sometimes three days. In the interval they have no trouble with it whatsoever. Instead of the expensive aluminum apparatus ordinarily provided or the horrible colostomy bags, it has been our practice for the past ten years, to provide our patients with simple lucite plaques. They cost only two cents each and can be worn very comfortably under a woman's girdle or under the ordinary type of a man's supporter or a belt. It is important that these plaques be not fixed to the belt or girdle. They will adhere to the colostomy and allow the patient perfectly free movement, so that he or she may indulge in all forms of sports and the plaque will not be pulled off the colostomy but

the belt will slip over the top of the plaque. For some patients it has been found better to provide an irrigating apparatus which they may use once every forty-eight hours, but for most this is an entirely unnecessary procedure and makes the patient's life more difficult than it need otherwise be. One man whom we operated on recently resumed full work as a foreman, three weeks and three days following operation.

We have found that colostomy, if finally made at the time of preliminary operation, may be too long or too short and have adopted Dr. Gabriel's idea of leaving it too long to begin with and cutting it later with a cautery at any desired length. Also by removing a little extra skin, no strictures will develop and if no sutures are placed between the bowel and the peritoneum or fascia, no subsequent annoying fistulae will develop.

1414 Drummond Street.

TRAUMATIC "UNCONSCIOUSNESS"— A CLINICAL MISNOMER*

Present Concepts of States of Impaired Consciousness

Norman Delarue, B.A., M.D.†

Toronto General Hospital, Toronto, Ont.

THE following discussion is presented as an outcome of experiences with over 3,000 head injuries seen during the war, 2,500 of which were treated by the Canadian Mobile Neurosurgical Unit in Europe from July, 1944 to December, 1945. During the actual conflict both closed head injuries and penetrating gunshot wounds of the skull were referred to this unit as part of a Head Centre, and of course at that time our interest centred almost entirely upon penetrating wounds, a report of which is to appear in a companion article; but following the cessation of hostilities this interest turned abruptly to a consideration of severe closed head injuries which continued to be referred to the Special Centre. Approximately 500 such cases were seen in the months immediately following V-E day and almost all of these repre-

sented grave injuries occurring largely as the result of road accidents which were an accompaniment of the tremendous traffic congestion along main communication channels on the Continent. It was during this period that it became apparent that the war-time emphasis on segregation of head injuries was having widespread repercussions in the attitude of medical officers in general towards the problem of closed head injuries, an attitude which is, I believe, being carried back into general medical practice.

Two fundamental concepts were a necessary part of the satisfactory treatment of penetrating head wounds during wartime: (1) Recognition that the initial operation should constitute a thorough and complete wound excision with the achievement of primary closure over the bone defect at all cost. (2) Recognition that this procedure could be adequately performed only by specially trained personnel supplied with the necessary special equipment.

In view of the fact that a sufficient number of trained neuro-surgeons were not available, it was found feasible to have only one centre to which these cases were of necessity evacuated directly, and this meant that all casualties of this kind were subjected to a period of transit almost immediately after injury, a procedure in keeping with the generally accepted aphorism that "head injuries travel well". This misleading generalization arose as a result of the fact that a large number of the cases suffered penetrating injuries of the skull and brain caused by high velocity missiles, a type of lesion which was not associated with major changes in the conscious state unless grave damage to the vital centres had been done at the time of injury, by the course of the missile or by the dissipation of force laterally along a transverse missile path. Consequently these patients, being conscious, were not affected adversely by obstruction to respiration nor were they subject to secondary shock to the same degree that casualties with compound fractures of limb bones, associated with a great amount of soft tissue damage, were prone to develop, particularly in the forward zones when these injuries were of necessity imperfectly immobilized by temporary splintage.

However the patient who is deeply unconscious presents an entirely different problem and reacts poorly to movement no matter what the underlying etiology may be. Protective reflexes are in abeyance, and respiration, possibly la-

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† Formerly Major R.C.A.M.C. and Officer Commanding No. 1 Canadian Mobile Neurosurgical Unit.

boured as a direct effect of the injury, is still further hindered by obstruction of the airway by the tongue in unsuitable positions and by the accumulation of mucous secretion or blood or occasionally cerebrospinal fluid in the nasopharynx. This leads to anoxæmia and cyanosis associated with venous obstruction, the worst possible circulatory state for brain tissue that has been injured and which is normally so sensitive to oxygen lack. It was an unfortunate experience, common to all who were associated with the treatment of neuro-surgical casualties, to encounter cases who had not been deeply unconscious at the time of injury but whose cerebral condition had been aggravated during transit as a result of strangulation or asphyxiation, the resultant anoxæmia rendering irreversible, changes which had previously not been of such a severe degree.

When one considers that special neuro-surgical advice is available only in larger centres, it becomes apparent that this type of head injury in civilian practice must become the initial responsibility of the physician or surgeon who first sees the patient. Fortunately the patient who has been rendered unconscious as a result of trauma does not present an acute surgical emergency, for secondary pathological complications take several hours to develop and there is time in which his condition may be assessed, and attention paid to the treatment of associated shock states and the establishment of an adequate airway. During this phase of assessment also, the diagnosis of the type of cerebral injury can be made with remarkable accuracy without the specialized armamentarium of the neuro-surgeon, and the problem thereafter resolves itself into the recognition of the complications of cranio-cerebral injuries that require craniotomy and which may be transferred if necessary to centres where neuro-surgical attention is available, provided care is taken to ensure adequate oxygenation at all times.

With this in mind and in an attempt to emphasize the importance of a more generalized interest in these patients the following principles are presented, for as Rowbotham¹ points out in his excellent treatise it has long been the custom to consider the patient rendered "unconscious" by trauma as a hopeless problem whereas in a controlled comparison of two groups of similar cases, one treated actively

and the other without any special intervention, the mortality was 30% greater in this latter group and the occurrence of secondary changes in those actively treated dramatically reduced, surely a significant and worthwhile difference.

The truth of this latter observation has recently been re-emphasized by Mock² who conducted a nation-wide survey of 38 hospitals and obtained records of 3,106 consecutive head injuries associated with skull fractures. In his analysis of the results obtained in the treatment of these patients he assessed the mortality rate in relation to the grading of hospitals, this grading being based upon the observation of the patient, the general treatment received, the observation of shock rules, the adequacy of dehydration when it was used, and the use of lumbar puncture when indicated during the first 24 hours, associated with the drainage of sufficient spinal fluid (20 to 70 c.c.) to be of value in combating increased intra-cranial pressure. The operative judgment exhibited in those cases which came to operation was also considered. Once again there was a significant difference between the mortality in hospitals rated "good" where the mortality rate varied between 17 and 21%, and hospitals rated as "poor" with mortality rates varying between 30 and 42%. Hospitals graded as "average" showed rates ranging between 21 and 29%.

These findings of such appreciable differences in the results obtained when an intelligent and reasoned approach is made to the problem as compared to the time-honoured relegation of such patients to a corner of the ward where they will not disturb others or be disturbed unnecessarily, is of particular significance when one realizes that the great majority of patients who survive make an eventual complete organic recovery. Hyde³ points out that this figure reaches as high as 80% in well-controlled series and also emphasizes the fact that it is amazing what compensation can be made from residual organic defects over a period of months or years.

The organic brain injury may be of two types: (1) Regions where the cells are hopelessly damaged and incapable of recovery. (2) Regions where the cells are partially injured but capable of recovery provided they are supplied with optimum environmental conditions and not subjected to further insults.

Consequently, the prime object in treatment must be the maintenance of these optimum conditions at all times and this implies an adequate blood supply bringing sufficient oxygen and nutritive elements to ensure normal cellular metabolism. These optimum conditions may be adversely affected in the immediate post-traumatic period by a reduction of the circulating blood volume in shock or interference with oxygenation by an obstructed airway, and all other treatment may be of no avail if these two conditions are not prevented or adequately treated by the physician first attending the patient.

Thereafter interference with the circulation may result from secondary increases in intracranial pressure and the fundamental problem becomes the early diagnosis of space-occupying complications so that further embarrassment of the circulation may be prevented.

PART I.—CONSIDERATION OF STATUS OF IMPAIRED CONSCIOUSNESS

As the title of this paper implies, probably no single clinical term of common usage both medically and surgically has achieved throughout the years such a multiplicity of meanings—or perhaps the description would be more apt were one to infer that the term has come to have little or no meaning—as the word “unconsciousness”.

I have on numerous occasions, taken the opportunity to question the individual members of specialized and general medical groups in an attempt to discover what meaning they intended to convey when describing a patient as “unconscious”, and almost invariably the variety of answers received approached in number those questioned, obviously implying lack of appreciation of the importance of a more precise definition of an altered conscious state. When, in addition to a consideration of the significant improvement in the results obtained in the treatment of these patients on a reasoned basis, it is further realized that minor alterations in the level of consciousness are the most delicate evidences of space-occupying complications, the significance of which is pointed out above, it becomes apparent that continued satisfaction with such a lack of precision amongst the general group of practising physicians who first see these patients must reflect adversely on the results obtained.

Therefore it would seem imperative that we have at hand some easily understood and readily applied means of designating different stages of impaired consciousness, preferably a plan capable of universal adoption, so that the patient's conscious state may be adequately described at any one time, thus enabling subsequent observers to determine whether his condition is improving or whether regression is occurring due to a pathological process that may be amenable to active treatment, either medical or surgical.

It is no longer sufficient to dismiss the description of the state of such patients with the clinical misnomer, “unconscious”, for it is this changing state of consciousness that demands our attention and a more specific description is essential. With this in mind a brief review of the present status of experimental concussion, and theories of the causation of changes in consciousness in clinical subjects, is presented, followed by a plan of classifying different levels of consciousness that has proved clinically acceptable in our hands.

Definition of concussion.—Experimentally, concussion is the term applied to a transient state of impairment of consciousness resulting from the application of an adequate force to the head and refers only to cases which show no associated contusion or laceration of cerebral tissue and in which no characteristic gross or microscopic organic lesions are discovered. As Groat, Windle and Magoun⁴ point out, in clinical experience concussion is often combined with traumatic interstitial hæmorrhage, contusion, or laceration of the brain and confusion will only result from the indiscriminate use of this unmodified designation in describing these clinical post-traumatic conditions. Consequently it is essential that “concussion” used clinically should be reserved to define a transient initial state of “unconsciousness” occurring as the result of a mechanical force applied to the head, for it is not designed to define any particular level of consciousness. Patients suffering from concussion may show an initial complete ablation of all central nervous system activity, which even extends to involve the vital centres for a few moments, but recovery usually progresses rapidly from this lowest neurological level to higher planes and consequently it is a dynamic rather than a static state. Moritz⁵ also points out that

obviously the occurrence of a concussion injury does not exclude the possibility of other forms of cerebral damage and as a corollary post-traumatic unconsciousness which is prolonged may not be the result of concussion, as the same impact producing the concussion may be so severe as to result in cerebral damage of a degree sufficient of itself to cause unconsciousness.

EXPERIMENTAL PRODUCTION OF CONCUSSION

Recently an opportunity for study of this condition has arisen following the brilliant experimental work of Brown and Russell⁶ who showed that concussion could be produced by imparting acceleration to the brain and without causing recognizable anatomical changes in the cerebral structure. They have shown conclusively that concussion occurs as a result of acceleration or deceleration of the brain at about 28' per second, whereas no recognizable effects on the state of consciousness are observed by the action of the same force, provided the skull is prevented from moving. Hyde³ utilizes this conception in explaining the concussion that occurs from a relatively mild tangential blow on the chin, this force causing sufficient rotational acceleration of peripherally situated brain cells by less energy than would be required for the production of sufficient straight-line acceleration in a direct blow in the same region.

In a most instructive group of experiments, Walker, Kollross and Case⁷ showed that at the moment of concussion a marked electrical discharge occurred within the central nervous system. After this initial discharge there was a period of 10 to 20 seconds in which there was a marked increase in the frequency of cortical activity followed by a marked decrease, until there was little spontaneous activity. As they point out in their analysis, these electrical potentials developing in the zone of concussion must be derived from polarized structures within the central nervous system, there being two such systems present: (1) the axone and its surrounding nerve sheath which remains polarized except during the actual passage of nerve impulses, and (2) the nerve cell whose membrane acts as a polarized surface and against which lie the end-processes of many axones which are likewise bioelectrically charged; and they suggest that this traumatic discharge of the polarized cell membrane of neurons of the central nervous system by the commotion of the brain, is actually the physiological basis of concussion, the subsequent course of events being due to the discharge of large masses of nerve cells. Consequently they look upon concussion as "excitatory" in nature rather than "paralytic", the latter process being the normal sequela of primary intense stimulation and termed "extinction", recovery tending to occur only after there has been sufficient time for re-polarization of these membranes. These experimental results may be of great significance for they bring us back to the original description by Duret⁸ of the acute manifestations of concussion in animals, in which he stated that they consisted of both convulsive and paralytic states. Clinically we have been impressed by the secondary paralytic effect and have largely neglected the initial convulsive phenomena which may be the fundamental process in concussion.

CAUSATION OF "UNCONSCIOUSNESS" IN CLINICAL SUBJECTS

Many theories have been advanced to explain the causes of death in patients in whom no organic changes are found at post mortem examination, and by and large these theories fall into two broad groups: (1) those impli-

cating the brain stem primarily; and (2) those suggesting that diffuse cortical lesions are the primary factor.

The successful total removal of one or other of the cerebral hemispheres proves that no portion of the brain above the basal ganglia can play any part in profound alterations of consciousness, and all observers are agreed that brain stem injury can cause coma. Consequently many believe that lesions in this region are the primary cause of changes in consciousness, pointing out that most patients who are deeply unconscious show disturbances of pupillary reaction, respiratory and pulse rate, blood pressure and such lower level reflexes as the corneal and pharyngeal. Penfield⁹ pointed out that lesions about the thalamus are more apt to lead to unconsciousness than lesions elsewhere, and Dott¹⁰ also observed that tumours in the anterior end of the third ventricle when involving the hypothalamic nuclei are occasionally associated with unconsciousness. Duret¹¹ believed that concussion was due to an injury of the walls of the third ventricle, or aqueduct of Sylvius, and possibly also the fourth ventricle, by a wave of cerebro-spinal fluid travelling forcibly from a site of origin in the lateral ventricle towards the spinal canal. Greenfield¹² suggested that a sudden displacement of the hemisphere in relation to the incisura tentorii stretches or deforms the connection of the brain stem to the hemisphere, causing damage to the thalamus or isolation of the hemisphere.

Recently, Jefferson,¹³ although admitting that full consciousness in the psychologist's sense is mediated by the cortex and that the post-concussive sequelae of focal paralysis and mental disorder, coupled with the necropsy findings, prove that cortical and sub-cortical lesions of varying degree occur, nevertheless points out that these are not necessarily the cause of the initial stupor. From cases of non-traumatic local bleeding he deduces that the condition is due essentially to a brain stem or hypothalamic lesion, and as the electroencephalogram pattern after craniocerebral trauma may be similar to that seen in sleep, he suggests that it would be helpful to define "unconsciousness" by some new term denoting unnatural or traumatic sleep, a state in which no verbal or mechanical responses to stimuli are obtained except those of a reflex nature. For this condition he has coined the term "parasomnia". Interestingly

enough, Hess¹⁴ proved by animal experimentation 15 years ago, that there was a "sleep centre" in the hypothalamus producing sleep states by electrical stimulation of this region.

More recently Dandy¹⁵ has implicated the corpus striatum as the result of an extremely astute series of observations. He had originally observed a "total and permanent" loss of consciousness following bilateral ligation of the anterior cerebral vessels and along with Poppen,¹⁶ who had noted similar phenomena, believed that the left vessel was responsible. However, it was well known that "unconsciousness" did not invariably follow ligation of the left anterior cerebral vessel and the latter observer suggested that a low blood pressure at the time of ligation was the underlying cause. However, in an analysis of 10 cases of post-operative unconsciousness of this permanent type Dandy demonstrated in 3 cases of resection of frontal lobes a sharply defined necrosis of the anterior part of the corpus striatum involving the head of the caudate nucleus and the lentiform nucleus (globus pallidus and putamen) due in 2 instances to a proved occlusion of the recurrent medial striate vessel and in one to direct trauma in the line of resection. The other cases were all of such nature that trauma of similar type could have resulted in this region and one of these was a case in which both anterior cerebral vessels were ligated at their origins from the internal carotid, of necessity obstructing the blood flow to both recurrent medial striate vessels. Consequently this author believed grave states of impaired consciousness to be due to involvement of the anterior part of the corpus striatum either as a result of direct trauma or involvement of its blood supply which, as in the case of the basal ganglia in general, is by way of end arteries. This obstruction could occur when both anterior cerebral vessels were ligated proximal to the origin of the recurrent medial striate vessels or when there was a retrograde thrombosis from a site of ligation distal to their origin, this latter method possibly explaining the value of maintaining the blood pressure at normal levels.

Rowbotham¹ on the other hand, as well as many other observers, believes that traumatic "unconsciousness" is due in the majority of cases to paralysis or dysfunction of cortical cells, or to blockage of sub-cortical pathways

and less often to local injury within the basal ganglia or brain stem. He points out that, in patients who are not deeply unconscious, but unable to hear, speak, see or think normally, the heart in most cases is regular, respirations usually have a normal rhythm and the metabolism of sugar and fat is carried out in a normal manner with no changes in heat regulation, these latter functions representing normal activity of brain stem and basal nuclei. In addition, these cases show mental changes in recovery such as mental confusion and defective memory which surely could not be evidence of brain stem recovery alone. In his summation of this problem Rowbotham expresses the view that consciousness is the sum of general nervous integration, and not the function of any specific area of the brain, "unconsciousness" resulting when a "quorum of integration is absent", this interruption of integration being more likely to occur in some focal area where many nervous pathways are congregated and a small lesion capable of producing widespread interference with nervous functions.

It is apparent that the two schools of thought are basing their opinions on clinical observations of patients in two different planes of consciousness, those favouring the cortical origin stressing changes in cortical functions seen in patients who are not deeply unconscious, and the proponents of involvement at lower levels emphasizing changes in function to be seen in patients who are clinically at a deeper plane of consciousness. Until the presence of a centre for consciousness is proved or disproved definitely, it would seem best to accept this distinction, emphasizing as it does the fact that patients who remain comatose have hypothalamic, brain stem or striatal lesions that are responsible for their clinical state, and that patients whose level of consciousness deteriorates from a state of confusion to one in which evidences of brain stem involvement appear, do so as the result of the occurrence of secondary complications increasing the intracranial pressure and affecting the hypothalamus or brain stem by pressure coning at the tentorium or foramen magnum, (or possibly the corpus striatum by further embarrassment of the circulation,) in each case causing reversible changes to become more permanent in nature.

In the initial phases of concussion, the vital centres may be involved momentarily as an

indication that the brain stem is affected, possibly by a process of massive depolarization as Walker *et al.*⁷ suggested, but in this condition it is a reversible change, the recovery of which may occur more readily than the cortical changes, evidences of which remain in the confused state or the organic deficit of local contusion and lacerations. Whether a centre of consciousness is present in these lower regions or whether a lesion in this area simply involves a sufficient number of nervous pathways to disorganize central nervous system function sufficiently to result in "unconsciousness", is of academic interest, until such time as an actual centre is discovered. Of practical import however is the recognition that the

conscious", with no attempt being made to make any further analysis of the state of consciousness. This regrettable confusion has recently become more noticeable with the current reports of experimental production of "concussion", a word previously having a fairly well defined clinical connotation, but which now, with a lamentable lack of care, has been applied to states of "unconsciousness" after trauma in clinical subjects. This application has been made with little or no recognition of the fact that concussion is a transient state showing dynamic features, the level of consciousness varying almost momentarily, whereas clinically it is usually accompanied by other pathological changes which render the state less labile and therefore

TABLE I.
LEVELS OF CONSCIOUSNESS

State	Reflexes	Response to painful stimuli	General features
Full consciousness	Normal	Normal purposive motor response	Normal psychological adjustment to environment
Concussion	Vary	Varies	A dynamic rather than a static condition
Confusion	Normal and active	Purposive motor response	Responses easily obtained but patient usually restless, irritable and disorientated
Delirium	Normal and usually active	Purposive motor response	Patient drowsy and responses more difficult to obtain. Commonly restless when roused
Stupor	Present — may show minor changes in the activity or nature of high level reflexes	Non-purposive motor response	Drowsiness marked and patient very difficult to rouse
Semi-coma	Reflexes mediated at a high level absent or grossly altered and low-level reflexes usually diminished in activity.	No motor activity	A grave state of ablation of all C.N.S. activity except that on a reflex level
Coma	No reflex activity	No motor activity	Patient usually shows in addition changes in the vital functions of respiration and circulation

deeper planes of impaired consciousness are due to lesions in the hypothalamus, brain stem or corpus striatum and are in all probability not primarily cortical or sub-cortical in origin.

PART II.—CLASSIFICATION OF LEVELS OF CONSCIOUSNESS

A correct appraisal of the patient's conscious state is imperative at all stages of the clinical course after injury for, as has already been emphasized, the most delicate indication of recovery or regression is a change in the level of consciousness preceding as it usually does, any change in other neurological signs. Unfortunately much confusion has arisen in the past from the application of the term "unconscious" to any patient after injury who is not "fully

capable of designation by clinical terms. Recognizing this state of affairs, the Brain Injuries Committee of the Medical Research Council of Great Britain published a War Memorandum (No. IV) in 1941 entitled "A Glossary of Psychological Terms Commonly Used in Cases of Head Injuries" with a view to the facilitation of the adoption of a standard terminology. This has been accepted by specialists working constantly with these problems but apparently has been too complicated in scope for general adoption by practicing clinicians, and consequently a simplified plan is needed for general use, based on readily understandable and easily applied clinical tests. The following classification is presented (Table I) in which we have adopted for exclusive use the two most

straightforward neurological tests currently in use, namely reflex changes, and the response to painful stimuli.

In the consideration of reflex changes we are interested in the first place in those changes which indicate involvement of cortical components, as for instance the appearance of an extensor plantar response connoting as it does a lesion affecting some portions of the pyramidal pathway, and in the second place changes in such low level reflexes as the corneal or pharyngeal demand our attention, for, being completely mediated at a brain stem level, they indicate a lesion which is affecting these more vital centres either primarily or secondarily as a result of foraminal herniation. It is important to realize too that reflexes mediated at a high level are the first to be lost or altered as depth of unconsciousness increases, and diminution or loss of abdominal reflexes or alterations in plantar responses may occasionally be the first indication of the onset of secondary pathological changes after cerebral trauma, even preceding fine changes in the conscious state which are commonly a more delicate guide.

When evaluating responses to painful stimuli, the commonest mistake is the application of a stimulus that is not truly painful, for even a delirious patient may not respond in a purposive manner unless he is sufficiently roused from his drowsy state and in deeper planes of unconsciousness mild stimuli are of no clinical significance. The three tests we have found most useful have been pressure over the supra-orbital nerve as it emerges from the orbit through the supra-orbital notch, severe testicular pressure and extremely forcible plantar flexion of the big toe. Our interest centres here primarily in the purposive nature of the response elicited and it is usually surprisingly easy to distinguish a definite objective if the movement is designed to rid the subject of the noxious influence. In cases in which non-purposive activity is the response elicited it is signified by vague unrelated movements of the hands or legs often of postural nature, and associated with deepening and increased rapidity of respiration.

1. *Full consciousness*.—This state, representing as it does normal function of the organism, requires a psychological rather than a neurological definition. According to Mapother,¹⁷ consciousness is represented by an awareness of the organism of the external environment and is

associated with accessibility. Russell¹⁸ states that in the fully conscious state any occurrence in which the patient is actively or passively concerned makes an impression on his memory that can subsequently be recalled and therefore suggests that states of impaired consciousness may be measured by the length of periods of post-traumatic amnesia. In the strictly psychological sense, "unconsciousness" is associated with a cessation of those mental processes which may normally be engaged by an examiner but as many observers have pointed out, some form of intellectual activity remains as may be exhibited by restlessness and this is particularly well shown by the patient who attempts to get out of bed to relieve a distended bladder.

The term "unconsciousness" must no longer be recognized as having a specific meaning in a clinical sense, but rather as a generic name under which the following levels of impaired consciousness may be grouped.

2. *Concussion*.—The state of concussion has already been fully defined and is included in this classification in deference to its common usage rather than any application it may have in describing a specific level of consciousness. Typically, a patient who has suffered a concussion shows initially a complete paralysis of function, any convulsive or excitatory phenomena tending to be too early in occurrence to allow clinical description. This complete paralysis may extend for a few moments to involve the vital centres but recovery begins early in order of sequence from the lowest to the highest neurological levels. In the first place, functions mediated in the brain stem such as pulse and respiration return, and soon thereafter muscles regain their tone and the reflexes under cortical influence reappear. As the final stages of recovery take place, functions more definitely indicative of cerebral function reappear with purposive movement, restlessness and confusion prior to complete recovery of a psychologically adequate conscious level. In these cases who make apparently a rapid and complete recovery, Moritz⁵ stresses the fact that there is a stage of traumatic automatism of considerable medico-legal importance for at this time the patient may behave naturally and apparently be in full control of his faculties but is in actuality not really responsible for his actions and will subsequently, upon full recovery, have no memory of the

activities in which he engaged during this period.

3. *Confusion*.—This term is applied to the state in which although normal reflexes are present, and purposive activity follows the application of a painful stimulus, the patient is confused, disorientated both spatially and temporally and tends to be restless and irritable, responding readily to external stimuli. Restlessness rather than drowsiness is an outstanding feature and may possibly at this state represent a reaction of the patient to the meningeal pain of a subarachnoid hæmorrhage, although some believe it represents contusion of the frontal lobes.

4. *Delirium*.—This state resembles confusion in that normal reflexes are present and purposive activity results from the application of painful stimuli, but in contra-distinction the patient tends to be drowsy, although restless when roused, and there is increasing difficulty in obtaining responses to painful external stimuli. The restlessness in this stage may be a response to meningeal irritation but more often represents the response to unaccustomed stimuli such as pain, injuries, a full bladder, restraint, or bandages, and intelligent nursing care is essential in its appraisal.

5. *Stupor*.—The application of this term signifies the presence of reflexes which are grossly normal in type although tending to show diminution in activity and at this level of consciousness the patient now shows non-purposive activity in response to the application of painful stimuli. Drowsiness is becoming more marked and restlessness if present may be of a different type, consisting as Hyde³ points out, of the absolute constant and total restlessness which is often associated with injuries near the basal ganglia and consequently represents a grave prognostic omen. This conception implies a more specific meaning to the term "traumatic stupor" than does the M.R.C. definition which designates it as a "state in which the patient though not unconscious exhibits little or no spontaneous activity and in which confusion is always present".

6. *Semi-coma*.—This term is applied to a grave state in which there is absence of any motor activity, either purposive or non-purposive, in response to painful stimuli, and in which the reflexes though present in some degree show changes indicative of a lesion affecting the brain

stem, as for example, sluggish corneal reflexes or bilateral diminution or absence of abdominal responses, with the appearance of extensor plantar responses. This represents a deeper level of unconsciousness than is implied in the M.R.C. definition of a condition in which "psychologically understandable responses may be elicited only by painful or other disagreeable stimuli".

7. *Coma*.—The term "coma" refers to a state, often terminal in occurrence, in which no reflexes and no motor activity of any kind are obtained by the application of suitable stimuli. This conception more closely approaches the M.R.C. definition as a "state of absolute unconsciousness judged by the absence of any psychologically understandable response".

CONCLUSIONS

It is our thesis that patients who are deeply unconscious have a pathological lesion affecting the brain stem, hypothalamus, or corpus striatum while minor changes in the conscious level may be explained on a basis of involvement of cortical or sub-cortical zones alone. Consequently, if the patient shows gross impairment of consciousness immediately after injury which persists despite adequate treatment (implying the maintenance of adequate circulation and oxygenation) there is obviously no indication for surgical interference as the primary injury to these vital centres is not amenable to operative treatment. However, if the patient subjected to craniocerebral trauma is not deeply unconscious immediately upon receipt of the injury and thereafter demonstrates increasing impairment of the conscious level, the vital centres are being affected by a secondary space-occupying complication which is supra-tentorial in almost every case and therefore subject to surgical attack. Once again it is the changing level of consciousness that demands attention.

As a rough guide it has been our practice to consider a patient whose response to painful stimuli is no longer purposive in nature (or in other words one who is stuporous, semi-comatose, or comatose) as having suffered a major craniocerebral injury with presumptive evidence of involvement of the more important lower level centres which precludes early operative treatment unless a change in the conscious level suggests a progressive lesion that could be supra-tentorial in type. It is in the remaining group of patients who have suffered rela-

tively minor injuries that surgical treatment is largely carried out, the object of active treatment being the prevention of the adverse effects of space-occupying intracranial complications. The value of this fundamental differentiation between patients who have suffered a major or a minor injury, in the early treatment of acute closed head injuries has been already pointed out in another publication.¹⁹

Consequently, the importance of an accurate description of the state of consciousness becomes again apparent and although the use of definitive terms such as outlined above preserves a precise nomenclature that may be readily and safely applied in special centres where their full meaning is adequately understood, it is felt that a brief description of the reflexes and the response to painful stimuli is so easily made, that this latter procedure is best utilized by the general medical group.

Although this clinical description of the conscious level is by far the most important diagnostic consideration in these acute cases, there are, of course other features of the clinical examination which are important in the detailed appraisal. Nevertheless we are firmly convinced that the tests we have emphasized are essentially the most important and form a satisfactory basis for the immediate examination. Seldom will additional clinical procedures add significant knowledge to this original appraisal.

SUMMARY

1. Reports are quoted emphasizing the improvement in the results obtained in the treatment of acute closed head injuries when a reasoned approach is made to the problem.

2. The primary lesion resulting from the craniocerebral trauma is not amenable to surgical treatment although active measures must be taken to ensure the maintenance of optimum conditions for the recovery of cells that are not hopelessly damaged. This involves the maintenance of an adequate circulation providing sufficient oxygenation and nutrition.

3. Active treatment is designed to prevent the deleterious affects on the cerebral circulation which result from the occurrence of secondary space-occupying complications.

4. It is pointed out that the easiest and most delicate evidences of such complications are exhibited by changes in the conscious state and

consequently emphasis is laid upon the necessity for the adoption, by practising physicians and specialists alike, of a standard terminology to be used in describing the conscious level of patients subjected to craniocerebral injuries.

5. A general review is presented concerning modern theories of the causation of changes in the level of consciousness in clinical subjects with a discussion of the experimental basis and clinical background for these opinions.

6. A simplified plan of defining the levels of consciousness is presented, based upon the reaction of the patients to truly painful stimuli and the activity of the reflexes. This plan has proved capable of general adoption and ready application.

7. Finally, it is urged that the term "unconsciousness", which no longer has any specific clinical connotation, should be divorced from our medical vocabulary and in its place some method, either descriptive or definitive in type, be utilized to accurately describe or define the different levels of consciousness.

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Phosphorus burns are treated successfully with a solution of 1% permanganate of potash and 3% bicarbonate of soda, it is reported.

ORGANIZATION AND EXPERIENCE OF A LARGE INDUSTRIAL MEDICAL DEPARTMENT*

K. E. Dowd, M.D., F.A.C.S., F.A.M.

*Chief Medical Officer, Canadian National
Railways and Trans-Canada Air Lines,
Montreal, Que.*

THIS paper deals with the medical organization of the Canadian National Railways and associated companies.

A railway company has two physical assets. They are the inanimate and the animate. The inanimate assets are represented by rolling stock, tracks, bridges, roundhouses, repair shops, etc., making up all those things which are usually termed "property". The animate assets are the employees engaged in the work of maintenance of trains, tracks, yards and all the multiple activities of a railroad. Any company which did not maintain its tracks, bridges, rolling stock and other inanimate objects in good repair would be considered both negligent and wasteful and liable to damages in law for accidents due to unsafe conditions. In the same way the animate assets—the manpower that constructs and operates the inanimate property—will be maintained in good physical condition by every company which would ensure effective work by employees and, by the same measures, give protection to the travelling public.

The words "protection" and "safety" are ever recurrent in our everyday approach to our duties. To this end the Medical Service of the Canadian National Railways has been organized (1) for the protection of the travelling public and the Company from dangerous effects which may be caused by ill or crippled employees, and (2) for medical supervision of all cases of accidental injury occurring both to the travelling public and the Company's employees. The application of methods and arrangements for this service has been modified according to local conditions.

In a company the size of the Canadian National Railways and its subsidiaries, with approximately 115,000 employees, it is necessary to decentralize the medical service. The headquarters of the system, with its admin-

istrative staff, is located in Montreal. There are five regional medical officers, each with his respective staff, located at (1) Moncton, to cover the Maritime Provinces; (2) St. Albans, for the Central Vermont Railway; (3) Toronto, to cover the Province of Ontario; (4) Detroit, for the Grand Trunk Western Railroad; and (5) Winnipeg, for the Western Region, to cover the Prairie Provinces and British Columbia. Medical supervision for the Province of Quebec and New England Lines is handled through the Montreal office.

At these main centres we have established rather well equipped clinics for the treatment of accidental injuries and for the medical examinations of new applicants for employment, certain periodic medical examinations and emergent care of walking cases of illness. At these centres are employed full-time doctors, nursing staff, etc., and we have each centre equipped with an x-ray, short wave machines and various other physiotherapy equipment. At each of our large shops we employ full-time nurses trained in industrial nursing and a great deal of emergency care is rendered for both accident and early illness cases by these nurses.

Our medical service is also responsible for the examination and medical attention to all flight and other employees of Trans-Canada Air Lines and of the North Atlantic Division of British Overseas Airways Corporation, and in addition we take care of the medical services for the Canadian National Steamships.

Our clinics were established with a definite objective. Our endeavour was to provide a means towards improving the health of the employees, and, by early diagnosis, prevent or delay the onset of many diseased conditions coincident with the ageing process and particularly common to railroaders. Although at first our employees were rather dubious of our good intentions, we have, through judicious and sympathetic handling of each case, now won their full confidence and co-operation, with the result that they freely present themselves to our doctors for a physical appraisal of their condition. In each case this appraisal may consist of a general physical examination only, but it may also include x-ray studies, blood counts, blood smears, sedimentation rates, etc., which the examining doctor may deem necessary. A report of such examination is available to the family physician and every effort is made

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to ensure that proper treatment, if required, is undertaken. The services of our consultant specialists, to whom I have previously referred, are utilized as required in these cases. The operation of our clinics has clearly shown that they are of definite monetary value. It was soon found that the fees saved by medical attention to accident cases coming under the provisions of the various Workmen's Compensation Boards and also from physical examinations made at our clinic centres and medical offices more than covered the total operating cost of our services. At points where clinics are in operation, practically all accident or illness cases are referred to them for medical attention. If it is considered that the case should be hospitalized, arrangements are made for necessary admission.

One of our first efforts following the establishment of our medical clinics was the inauguration of pre-employment medical examinations for all applicants for employment. Initially this applied to applicants for duty at main centres, but subsequently the practice was extended over the whole system, so that today all applicants for permanent employment are given a pre-employment or, as it is now called, a "pre-placement" examination.

We have established certain broad principles to be followed by our examining doctors, and our standards of fitness for our hazardous positions such as firemen, brakemen, engineers, etc., are high. From time to time criticism has been levelled at our Company by interested but somewhat ill informed persons, wherein it is stated that we are too exacting in our demands for physically fit personnel. However, we must ever keep in mind that the employee in these hazardous positions has the safety of the travelling public in his keeping and we would be most negligent in our duty if we allowed unfit and unsafe men to enter these branches of our services. This does not mean that all such applicants must be turned aside. There are many positions in any transport organization where applicants with physical abnormalities may be placed and wherein their particular disability does not constitute a liability to themselves or our Company. It is in this latter field that the operation of "pre-placement" in suitable employment is most useful. Our records show that our rejections for railway service in all branches amount to approximately 3.6%.

Our next big step occurred when approval was obtained to examine all engine, train and yardmen every two years. These examinations are carried out by means of four travelling medical cars, each in charge of a qualified and specially trained medical examiner. These cars travel about the country from divisional point to divisional point and all employees in the so-called "hazardous" type of railway employment are carefully checked over. The reports of these examinations are sent to each regional medical officer and are reviewed fully. In those cases in which physical abnormalities are noted, the employee and his family physician are forwarded a letter requesting that treatment be undertaken, and a report of such treatment, with progress notes on same, is obtained. In this way the beginning diabetic is given early treatment, the high blood pressure patient is checked, teeth, tonsils or other sources of infection are eliminated and the individual is presumably better fitted to carry on his employment. Through such a method of procedure we consider that the family doctor will not feel that we are unduly entering his field of private practice and we hope to maintain his friendly co-operation in any treatment and follow-up which the case may require. We have been successful in our efforts to this end and the doctors throughout the system have, for the most part, been fair and reasonable. However, on this point there is noted in some areas a tendency to give the patient any certificate he may demand. Many times we receive certificates supporting requests for sick leave, retirements on pension, etc., or, on the other hand, certificates stating that the employee is fit for duty, which certificates in our opinion are not based on sound medical observation or common sense. I would like to suggest to our confrères that the issuance of certificates so requested be regarded with a greater appreciation of the employee's duties and that consideration be given to the welfare of the employee, his fellow workers, the travelling public and the company concerned.

The medico-legal work of our department can be best dealt with in two parts. The first part deals with accidents and resulting injuries to our own employees while in the course of or associated with their work. These cases come under the jurisdiction of the various Workmen's Compensation Boards and Commissions. Our department renders medical attention to as many

of these cases as possible in our own clinics. Examinations are also made of contentious cases in which we feel that the patient is not progressing as might be expected or in which we feel that anything associated with the case is not satisfactory. We endeavour to maintain a close liaison with the officers of all the Workmen's Compensation Boards and a close check on periods of disability, the assessment of permanent partial disability and other features of this particular work. Our objective in these cases is to see that (1) our employees get as excellent a result as is possible, and (2) that the workman and the Company are mutually satisfied.

The second part of this work deals with passengers and others who may be injured while using the railway's facilities, while on the railway's property, or in crossing accidents of various kinds. We usually do not treat these injured persons ourselves, this being taken care of by their own doctors. We come into the picture when the case is approaching the settlement stage. We examine each individual fully and give an informed opinion to our legal department, as to the amount of disability, etc., which is used as a basis for settlement.

Rehabilitation of our injured workers and the return to service of former employees who have suffered injury or illness while on military service has demanded the close supervision of well-trained medical staff who are cognizant of the medical requirements of railroad operations. Were it not for our careful appraisal of these cases, many men would have been assigned to hazardous duty wherein their employment would have been a serious danger to themselves, their fellow-workers and the travelling public. In order that every consideration may be given to these employees, there has been established a rehabilitation committee consisting of system and regional officers and general chairmen of the Railway Brotherhoods. This committee meets every four months to review all cases and report as to the most suitable positions that these employees are capable of taking. Through the earnest co-operation of all members of this committee and employing officers, this work has met with notable success.

In addition to the above mentioned employees disabled in the railway proper, there have been great numbers of ex-employees who have returned from military service suffering from

disabilities sustained in war service. We have been co-operating fully with the officials of the Department of Veterans' Affairs in the placement of these men, consistent with safe railway operation. If time permitted many examples could be given of placement of such individuals.

Sanitation.—I would like to refer briefly to our work on railway sanitation. If it were possible to assemble in one area the many trains, stations, restaurants, hotels, commissary stores and camps comprising the Canadian National Railways System, it would represent a large city or municipality. The fact that trains equipped with sleeping and dining cars are continually on the move from one point on the system to another makes the enforcement of effective sanitary standards a somewhat complex matter, requiring constant supervision. In order to take care of the sanitary situation, sanitary officers are stationed in each Region. These men work in close co-operation with each other, particularly in regard to passenger equipment engaged on transcontinental runs. They are all well-trained sanitation experts and they are all ex-servicemen who were directly connected with sanitary units during the war. Furthermore, they all hold certificates in sanitary inspection of the Canadian Public Health Association. To make a success of railway work, the sanitary officer must possess the ability to co-operate and "get along" with employees, and at the same time be sufficiently aggressive and determined to overcome opposition, or what is much more difficult to contend with, complete indifference.

While the duties of the sanitary officers cover their entire region, some of their most effective work is carried out at the coach yards and terminals. It is at the yards that all trains are made up and such important matters as coach cleaning, icing and watering are attended to, and the dining cars are stored with supplies. At these points concurrent and terminal disinfections are carried out on equipment which may have carried passengers infected with contagious diseases. The necessary fumigations are the direct responsibility of the sanitary officers. A thorough sanitary check-up is made of all dining cars coming into the yards, including food storage lockers and ice boxes. Checks are also made at regular intervals for the presence of pests associated with food products.

The inspection of trains is an important part of the sanitary activities, but there are many other fields to be supervised. These include station restaurant sanitation where such matters as dish washing and general cleanliness are under periodic inspection. Bacteriological tests are taken from dishes and utensils from time to time in order to insure a high standard of efficiency. Similar inspections are also made of all hotel kitchens on the system.

A good deal of effort is being made to better the sanitary conditions of the stations. This is admittedly a difficult task. Unless you have had some experience with the personal habits of a no doubt very small minority of the travelling public, it will be impossible for you to conceive what can take place at a station. However, the sanitary officers are effecting considerable improvements in this respect, and the effort to correct conditions is being carried on incessantly.

Pest control operations have been turned over entirely to the sanitary branch. Such pests as rats, mice and obnoxious insects are bound to find their way into buildings and railway equipment, but by regular inspections and prompt action, they can be kept down to the point where they cease to be a major problem.

Apart from the work carried on in the field, a laboratory is available for the analysis of water and milk samples, dish washing tests and a limited amount of investigational work directly concerned with sanitation. Insecticides, disinfectants and sanitary supplies in general are all subject to laboratory investigation before being released for practical application.

There are many other items upon which I have not had time to dwell, such as the medical service of Trans-Canada Air Lines, British Airways, Canadian National Steamships, our First Aid Department, and other features of our organization.

In summary, the Canadian National transportation system is operated by a force of men highly trained and physically sound, and behind this force is an efficient medical department maintaining the physical condition and guarding the manpower of the companies concerned. From this necessarily brief summary of the activities of our Department, I trust you will appreciate that adequate medical care is afforded and that through such care the safety and protection of the travelling public is assured.

INFLUENZAL MENINGITIS*

Harold S. Little, M.B.

London, Ont.

DURING the past decade, great progress has been made in the treatment of influenzal meningitis. As a result, the mortality rate has been reduced from 98% to approximately 20%. This has been due to the discovery of sulfonamides, the antibiotics, and the use of a specific rabbit antiserum. This disease, which occurs sporadically, is predominantly a disease of childhood; 75% of all patients are under three years of age.

Pittman,¹ in 1931, showed that most strains isolated from the spinal fluid of patients with this disease belonged to the serological type B., one of six types all characterized by possessing capsules composed of polysaccharides. A few years later, type specific *H. influenzae* antiserum was prepared by immunizing horses, and thus an attempt was made at specific treatment for this disease. This treatment lowered the mortality rate to 80%.

In 1936, Horsfall *et al.*² showed that in the case of type specific pneumococcal serum, the therapeutic qualities of rabbit serum were superior to those of horse serum. They explained this finding as most probably due to the smaller size of the antibody molecule in rabbit serum, which enabled it to diffuse more readily into infected areas and thus combine more effectually with the antigen. Pittman, in 1931, drew attention to the close analogies in the antigenic structures of the pneumococcus and *H. influenzae* bacillus, and in 1938 this disease was first treated with *H. influenzae* type B. rabbit antiserum, combined with one of the sulfonamides which had proved an effectual antibacterial agent. With this treatment, Alexander³ had a mortality of 20% in a total of 90 patients. Smith, Wilson and Hodes⁴ in 1946 reported 28 cases of influenzal meningitis treated with the combination of sulfonamides and type specific rabbit serum with a mortality rate of only 15%.

When penicillin first became available, we were warned that *H. influenzae* was an organism resistant to the antibiotic properties of this

* From the Department of Paediatrics, Faculty of Medicine, University of Western Ontario.

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substance. However, when it became possible to use much larger doses, thus giving higher concentrations, strains of *H. influenzae* were found to be sensitive to penicillin. Straker,⁵ in 1945, reported such strains and Gordon and Zinnemann,⁶ 1945, in a survey of a large collection of *H. influenzae* strains, established that this was not an occasional phenomenon. Forty-three respiratory and 18 meningeal strains were all found to be sensitive to penicillin, most of them in concentrations which allowed a rational use of the drug in conditions due to this organism. Zinneman,⁷ 1946, reported 20 cases of this disease, 5 were treated with sulfonamides alone and only one recovered. Fifteen received sulfonamide and penicillin treatment and 8 recovered. It is the opinion of many that sulfonamides increase the effect of penicillin against any organism that may be sensitive to it. Bigger,⁸ 1946, suggested that these two preparations used together have a synergistic action against organisms which would be resistant to either if used alone.

Streptomycin in large doses, combined with sulfonamides, has been used recently in the treatment of this disease, with good results. Anderson and Jewell,⁹ 1945, Cairns *et al.*¹⁰ in 1946, reported recoveries by the use of these two therapeutic agents. Herrell and Nichols,¹¹ 1945, reported 4 cases of influenzal meningitis treated successfully with streptomycin alone, and Weinstein,¹² in 1946, reported the recovery of 7 of 9 cases treated with streptomycin alone. Silverthorne¹³ has had 16 recoveries in 20 patients. A few received both streptomycin and a sulfonamide, most of them streptomycin alone.

This disease is similar clinically to the other forms of bacterial meningitis seen in infancy and early childhood. It is well to keep in mind that the usual signs of meningeal irritation such as Kernig's sign, Brudzinski, neck rigidity, opisthotonos and tenderness along the spine are not as well marked as with older children. The onset is not so abrupt. This often results in a delay of some days before treatment is begun. Not infrequently, signs of a respiratory infection are present. Many of the patients have a bacteræmia.

DIAGNOSIS AND TREATMENT

The spinal fluid of these patients is examined by direct smear and by culture to determine the presence of *H. influenzae* bacilli, then the

capsule swelling technique is carried out on the organisms in the spinal fluid. This is the quickest method of establishing the presence of type B. *H. influenzae* as the infecting organism. The result of this typing should of course be confirmed by agglutination of the strain isolated from the culture of the spinal fluid by the specific antiserum.

As soon as a diagnosis of influenzal meningitis is made a continuous intravenous injection of 5% glucose in normal saline is given to supply fluids and nourishment to patients who are dehydrated and seriously ill. The specific antiserum to be administered is given with the continuous intravenous injection during the first two hours. The amount to be given depends upon the severity of the infection and the best index of the severity of the infection is the concentration of sugar in the spinal fluid withdrawn before treatment. The lower the concentration, the greater the severity, and therefore the more specific antiserum required. The specific antibody present in the therapeutic serum is given in milligrams of antibody nitrogen. The aim should be to give at one time all that is necessary to bring about recovery. To ensure that the patient has received sufficient rabbit antiserum, the capsular swelling test should be done. If the patient's blood serum, following treatment, diluted 1 in 10 shows capsular swelling of the organisms cultured from his spinal fluid, it indicates that antibodies are in excess in the blood stream, and no further serum is necessary. If capsular swelling is not demonstrable and a few colonies are present on culture, then more antiserum should be given.

For the first day or two soluble sulfadiazine, 4 gr. per pound of body weight per day is given by injection into the rubber tubing of the continuous intravenous. This amount is divided into six equal doses and given every four hours. Sulfadiazine has proved experimentally to be the most effective of the sulfonamides in influenzal bacillus infections, both by protective value in mouse infection and by its inhibitory capacity in test tube. These patients are also given 10 gr. of sodium bicarbonate by mouth every four hours. A lumbar puncture is done daily for the first week and if the drug level estimation goes above 15 mgm. %, the dose of sulfadiazine is reduced.

Certain changes in the spinal fluid are carefully watched from day to day as they indicate the progress the patient is making. An increase in the sugar content of the spinal fluid is an important prognostic sign, but of much greater importance is the absence of any growth on culture of the spinal fluid, and particularly so if the cultures remain sterile each succeeding day, and that clinical improvement accompanies these changes. A number of the patients received a blood transfusion. There is a marked tendency to develop anæmia with this severe infection.

Even when doses of 50,000 to 100,000 units of streptomycin are given every three hours intramuscularly to patients with influenzal meningitis, the concentration in the spinal fluid is not adequate and streptomycin should be given intrathecally—25,000 to 50,000 units into the subarachnoid space each day. Some give as much as 100,000 units intrathecally each day. This treatment should be continued for four or five days. The spinal fluid should be checked each day for the streptomycin concentration, and also to make sure the organisms cultured from the spinal fluid have not become resistant to this antibiotic. These resistant strains are mutations, and are most likely to arise if the infection is a severe one. The patient, however, still has an active infection. From the standpoint of treatment, it is of great significance that the mutants which are resistant to streptomycin are usually sensitive to sulfadiazine.

During the past few years, 21 patients with influenzal meningitis have been treated at the War Memorial Children's Hospital, London. Sulfonamides, specific antiserum and the streptomycin have been used in the treatment of this condition. A few patients had been given penicillin both intrathecally and intramuscularly before admission to the hospital. Twenty of these patients were under four years of age and the other one was an eight-year old girl. Twelve made a complete recovery. The mortality rate was 43%. Seventeen of these patients were admitted directly to the Children's Hospital. The other four patients had been under treatment in other hospitals beforehand. The following symptoms were present: irritability, vomiting, fever, generalized tenderness (this is a diagnostic sign of real importance in infants) and drowsiness. Some of the very

young infants had cyanotic attacks and convulsions. The clinical picture in a number of these patients was not that of meningeal irritation. A number did not have neck rigidity. With some, a tentative diagnosis had been made of an upper respiratory infection or pneumonia. Nearly all had been ill for some days before admission to hospital. This very fact *viz.*, that there is not a clear-cut clinical picture of meningitis, results in many cases, in a delay of some days before the institution of treatment, and this has a significant bearing upon the prognosis. In all nine patients who succumbed, symptoms had been present for some days before treatment was started.

All the patients who recovered had sterile spinal fluid cultures after the first 48 hours, and they showed marked improvement clinically within five days to a week. Serum reactions, such as rigors and high fever, were encountered in a few patients but they responded quickly to the administration of 2 to 4 min. of epinephrine.

DISCUSSION

Recovery from influenzal meningitis is reported from time to time by the use of the sulfonamides alone but it is generally accepted that if this is to take place, the infection must be a mild one and also that treatment must be started early in the course of the disease. Case 11 in this series emphasizes the risk in relying upon sulfonamides alone. This 15 months' old male infant had been treated for influenzal meningitis for three weeks in another hospital and had received approximately 6 gr. per pound of body weight per day of sulfadiazine. During this three weeks of intensive sulfatherapy, there were a few days when he appeared improved clinically, but repeated cultures of spinal fluid showed a growth of *H. influenzae*. This treatment had failed to eliminate the organisms from the spinal fluid. On admission to the Children's Hospital, his urinary output was considered adequate. The laboratory reported his urine as normal and no sulfa crystals were seen. His spinal fluid was examined and on direct smear a few Gram negative bacilli were seen, and on culture a pure growth of *H. influenzae* was obtained. At this time, the cerebrospinal fluid sugar content was 10 mgm. %. A continuous intravenous injection of a 5% glucose solution was given and with this, 100 mgm. of *H. influenzae* type B. antiserum which he re-

ceived in the first two hours. The sulfadiazine, which had been discontinued two days previously, was again given and this time 4 gr. per pound of body weight each 24 hours. This was reduced by one-half five days later as each daily specimen of spinal fluid submitted to the laboratory was reported sterile on culture. Three days later it was again reduced by one-half, and in a further period of three days discontinued entirely. This patient was given a blood transfusion shortly after admission as his hæmoglobin was 52% and his red blood cells 3,600,000. He made a complete recovery and was discharged on the sixteenth day. This patient undoubtedly had a severe infection and should have received both sulfatherapy and serotherapy at the start.

Case 9 in this series was the eight-year old girl. She had been treated for meningococcic meningitis in another hospital for seven weeks. This child had received sulfapyridine 1 to 2½ gr. per pound of body weight each 24 hours for a period of seven weeks with the exception of six days when she showed improvement clinically, and the drug had been discontinued. Throughout this long period of sulfatherapy, there was the inhibiting effect of the sulfonamide upon the organism causing the infection, but it did not eliminate the organism from the spinal fluid. On admission to the Children's Hospital, her spinal fluid showed a few Gram negative bacilli on direct smear, and on culture a pure growth of *H. influenza* was obtained. The cerebrospinal fluid sugar content was 50 mgm. %. Into a continuous intravenous injection of 5% glucose in normal saline was introduced 50 mgm. of *H. influenza* type B. anti-serum. She received no further sulfatherapy. The spinal fluid withdrawn 24 hours later was reported as sterile on culture, as was each subsequent specimen of spinal fluid. This girl made a complete recovery and was discharged from the hospital thirteen days after admission. She has been examined upon a number of occasions since and appeared normal both mentally and physically, and is doing well at school.

This case illustrates not only the need of reliable bacteriological assistance for diagnosis, but also for this help throughout the period of treatment, to gauge the progress the patient is making.

A number of the infants had been treated for pneumonia or for an upper respiratory infection for periods of one to three weeks previous to admission to the Children's Hospital, having received one of the sulfonamides or penicillin or both. Here again there had been the inhibiting effect of the drugs upon the infecting organism with possibly some improvement clinically, but with each, influenza bacilli were found in the spinal fluid on admission. This failure to examine the spinal fluid earlier resulted in a late diagnosis and a delay in instituting effective therapy, and undoubtedly influenced the mortality rate.

Case 20 of this series was a fourteen-months' old infant who had been ill for at least five days before admission to the hospital. He was one who presented the clinical picture of meningitis. He had head retraction, neck rigidity and a positive Kernig's and Brudzinski's sign. The sugar content of the cerebrospinal fluid obtained at the first lumbar puncture was less than 10 mgm. %. We attempted to treat this patient with streptomycin alone and he was given 40,000 units intrathecally daily for the first five days and for the first four days he was given 40,000 units of streptomycin intramuscularly every three hours. On the fifth day the streptomycin was increased to 80,000 units intramuscularly every three hours. At the end of five days of treatment, organisms were still present in the spinal fluid and they were shown to be resistant to streptomycin, also each daily specimen of spinal fluid was reported as having less than 10 mgm. % of sugar. There was no improvement clinically and the fever remained high. The streptomycin was discontinued and the patient was given 100 mgm. of type B. *H. influenza* rabbit antiserum intravenously. He was also given sulfadiazine gr. 4 per pound of body weight each day. During the next six days the sugar content of the spinal fluid rose to 30 mgm. % and on two successive days the culture of the spinal fluid was reported sterile. Also, there appeared to be some improvement clinically; then organisms reappeared in the spinal fluid, so 25 mgm. of the antiserum was given intrathecally. However, the spinal fluid cultures remained positive for *H. influenza* and he succumbed (after 24 days of treatment). This patient had from the start signs of chronic meningitis and undoubtedly a severe infection, as the initial estimation of cerebrospinal sugar

was less than 10 mgm. %. Therefore the prognosis would be doubtful with any form of treatment known today, but it is possible that he might have survived if all three therapeutic agents had been used from the start.

SUMMARY

One is justified in using streptomycin alone if the infection is a mild or a moderate one as estimated by the sugar content of the spinal fluid before treatment, and also by the clinical picture. If cases are so selected the prognosis is good.

Since it has been shown that those strains of *H. influenzae* (the mutants) which become resistant to streptomycin during treatment with this antibiotic are usually sensitive to sulfadiazine, good results are being obtained from the use of these two therapeutic agents combined in moderately severe cases over 8 months of age.

If we are going to use streptomycin alone or with sulfadiazine we must have the aid of the laboratory to determine the severity of the infection, and also to estimate the progress our patient is making throughout the course of treatment.

In the treatment of all severe cases of influenzal meningitis, those with spinal fluid sugars of 10 mgm. % or less, and also in all very young infants, it would appear advisable to use all three therapeutic agents, sulfadiazine, streptomycin and the specific antiserum.

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RÉSUMÉ

On est justifié d'employer la streptomycine seule si le tableau clinique indique une infection légère et si la glycorachie n'est pas trop abaissée. Dans ces cas, le pronostic est bon. Depuis que l'on sait que certaines souches d'*H. influenzae* deviennent streptomycine-résistantes au cours du traitement et demeurent sensibles à la sulfadiazine, on emploie avec succès la combinaison de ces deux antibiotiques dans les cas de moyenne intensité chez les enfants de plus de 8 mois. Si l'on veut utiliser la

streptomycine seule, ou associée à la sulfadiazine, il faut la collaboration du laboratoire pour évaluer la sévérité de l'infection et l'effet du traitement. Dans les cas graves, il est prudent d'utiliser tous les agents thérapeutiques connus, i.e. la streptomycine, la sulfadiazine et l'antisérum spécifique. JEAN SAUCIER

A SERIES OF CASES OF PAINFUL BACK

J. A. Noble, M.B., Ch.B., F.R.C.S.[Edin.& C.]

Halifax, N.S.

THE cases comprising this study, 104 in all, form an unusual group, from the point of view of the general surgeon. The patients were veterans, of a definite age group; the average age was 33, there were only six over 50 years. They all sought relief of pain in a Department of Veterans' Affairs hospital, and they were under my supervision at some time during the past sixteen months.

It is unusual for a patient to complain of backache only. Almost always, sooner or later, there is an associated leg pain. It is generally accepted that we no longer limit a diagnosis to "sciatica", but now insist on an etiological diagnosis. In considering the underlying pathological state in the sciatic syndrome, it is claimed that it is a matter of the intervertebral disc versus the rest of the field. These other conditions feature largely in the overall picture of low back pain. It is with this part of the subject that the present discussion is mostly concerned.

The following table shows the etiological classification of these cases.

TABLE I.

Postural strain	8
Arthritis	8
Spondylolisthesis	3
Traumatic strain	
Chronic	11
Acute	1
Spondylitis	
Ankylosing	4
Tuberculosis	3
Fibrositis	4
Bone injury	3
Unclassified	17
Sacralization	5
Spina bifida	3
Both	1
Remainder	8
Intervertebral discs	
Treated conservatively	16
Treated by operation	26

The diagnosis of postural strain was based either on the abnormal posture assumed habitually by the patient, or on the x-ray appearance of the

lumbo-sacral part of the spine. The protruding abdomen with poor muscular tone, and the acute angulation at the lumbo-sacral junction were rarely seen in patients who did not complain of a low back ache. It is not surprising that there was a small number only who showed arthritic changes, considering the relatively young age group. One of these cases showed Paget's disease, and two were described as having osteitis condensans ilii. One was discharged from the Navy overseas, with a diagnosis of sacro-iliac arthritis. The three cases of spondylolisthesis afforded no difficulty in diagnosis, the x-ray demonstrating clearly the isthmus defect. Two were of grade three severity.

The term "strain" is perhaps a loose one and not sufficiently specific. In this series I applied it to patients who had had some form of injury. The clinical examination showed no postural or structural abnormality. The alignment of the spinal column was physiological. X-ray examination demonstrated no arthritic change and no abnormality of spacing. The neurological examination revealed no evidence of root pressure. And yet, all of these patients, with the exception of the one acute case, had recurring episodes of disabling pain in the lower back. The positive objective signs were local tenderness, muscle spasm and, of course, limitation of movement.

It will be interesting to follow the subsequent course of these patients with strain following injury, in respect to the occurrence of an intervertebral disc lesion. It is almost certain that a tearing injury of ligamentous structures has occurred, but which part is often mere conjecture. But it may very well have been fibres of the posterior longitudinal ligament, or even of the annulus fibrosus itself. For sure, before the nucleus pulposus or a degenerated disc can protrude or become sequestered, the restraining ligaments must first give way. We know that a torn ligament elsewhere in the body frequently remains as a weakened structure, prone to cause recurring trouble. We recognize in this group the episodes of recurrences, and we recall the frequent bouts of "lumbago", to give it a name, which characterize the typical story of the patient with a protruded lumbar intervertebral disc.

Of ankylosing spondylitis, or Marie-Strümpell's disease, there have been four cases. This

disease has an insidious onset, and very little may be found objectively at the early examinations. We have found it important to watch carefully a patient in whom the complaint of stiffness of the back and chest is prominent. The erythrocyte sedimentation rate is frequently elevated. In addition to the three cases of tuberculosis of the spine in the series, there were two other cases in which the presenting symptom was the swelling of a cold abscess in the groin. These have not been included in the series.

In our cases of fibrositis we included only those who persistently demonstrated localized tender nodules. We did find, however, that the label had been attached to a great many others, but we preferred to alter the diagnosis. When a patient has had previous trauma resulting in fractures of the vertebrae, or parts thereof, regardless of how well they may have healed, the residual symptoms are extremely difficult to evaluate. This applies particularly to compensation cases, and to those for whom a pension is being considered. Fortunately, we have had only three of this type.

In the unclassified group, the characteristic feature was the gradual onset, without any specific trauma. Usually in these cases the pain remained constant, and periods of freedom from pain were rare. In this group there happened to be: 5 cases showing unilateral sacralization of a lumbar vertebra; 3 in which the x-ray revealed spina bifida; and one in which both anomalies were present. In 8 cases there was no clue whatsoever as to the nature of the complaint.

By including these developmental anomalies in this classification, there is no intention to imply that they constitute a separate entity. It was interesting, however, to note that in the five cases in which an enlarged transverse process impinged on the ilium or on the sacrum, the pain in each instance was on the opposite side. It might also be mentioned that two of the cases of intervertebral disc lesion showed both sacralization and spina bifida.

In checking the histories of these cases, after they had been grouped together, I found that in not one of them had there been a history of trauma. In this respect they differed noticeably from the next and final group,—the intervertebral disc lesions. However, it should be noted that in cases proved by operation, there were at least six in which no injury was re-

ported (in one of them the condition started with bilateral sciatica), and in the group without operation there was an even higher percentage, or six in all. I feel that this is much too small a series of cases for a discussion of the intervertebral disc. However, from the diagnostic aspect we have been impressed by certain features that may be worth mentioning.

First, it would seem that injury, certainly any appreciable injury, is not necessarily a prerequisite in its production. This would imply that a primary degenerative condition of the disc may at times be the original fault, and that this later leads to a protrusion and to signs and symptoms of nerve pressure. Degenerative states in young people are, however, rare, and I believe it is much more likely that, owing to repeated postural strain or to habitual functional imbalance, the restraining ligaments have given way in a gradual process.

Secondly, the chronic course, with remissions, means great difficulty in diagnosis. As in the early stages of appendicitis, one must wait for other evidence than abdominal cramp: similarly, to establish the diagnosis in the protruded lumbar intervertebral disc, must one wait for other signs than are provided by the painful back alone. In nine of our cases proved by operation there was this history of recurring attacks of immobilizing back pain, and nothing else, until eventually the development of a locked spine, and/or signs of nerve root pressure brought the patient to operation. And in the cases treated conservatively, a comparable story was found in six.

I find it reasonable to compare those patients particularly whom I have called traumatic strain, with this group who have developed a protruded disc. How many of the strain cases will eventually be found to be discogenic in etiology? And how many of the protruded discs would have been, in fact were, considered as instances of strain when seen earlier? In one case, the patient had been seen by several of the consulting staff, and the clinical findings were those of a strain only. He was discharged to his home. Four months later when readmitted, he had not only the back signs of a "locked" spine, but he had definite evidence of a sciatic neuritis as well. At operation a protruded disc was demonstrated. I am convinced that the life story of this disc lesion was not confined to the four-month period.

Thirdly, we have been impressed, even in this small series, by the lack of uniformity in the clinical picture. In two of the proved cases there were back signs only, even though very careful neurological examinations had been performed; and in each of these cases, massive sequestrations of disc substance were removed. In another definite case the sensory function remained unaltered. And in a fourth, the only positive evidence consisted of the neurological signs.

TREATMENT

In considering the treatment, it is impossible to be specific until an exact diagnosis has been made. In certain conditions, *e.g.*, tuberculosis, and spondylolisthesis, the indications are clear and call for some form of fixation of the spinal column. But in others, the cause of the trouble is obscure, and the methods of obtaining and maintaining relief are not uniform. Any one, or a combination of two or more of the following procedures have been used: procain injections, specific exercises, immobilization (with a brace, by plaster of Paris, or by fusion), bed rest, associated with the application of heat and massage, manipulation, reassurance, and operative.

In order to correlate these therapeutic measures as specific indications in each diagnostic group, I offer the following comments: first, the injection of procain. This involves either the localized or diffuse infiltration of the erector spinæ group of muscles, or the epidural injection into the caudal canal. The latter method was used when the pain and tenderness were low down. In fibrositis the relief was dramatic. In the cases of recurring traumatic strain the effects were marked. In some cases of the latter, repeated injections were necessary; and in a few, after obtaining complete relief, recurrences responded favourably to the same treatment. This form of therapy, combined with rest, was stressed as of primary importance in this group.

It is to be noted that with these patients the symptoms occurred following a lifting or twisting injury. Muscle spasm was present in all; and, allowing that this reaction may be regarded as nature's response to injury, this same muscle spasm seems to have contributed largely to the pain mechanism. The alternative is that the local infiltration of procain may have dealt with the actual traumatized tissue, neutralizing its effects as a trigger area for a varying length of time. The relief obtained almost always lasted

for a period considerably in excess of that of the pharmacological effect of procain. Theoretically, this local injection of procain, when combined with absolute fixation of the part by plaster of Paris, should result in complete healing. While this may be so, it is our contention that stiffness is more apt to occur, and we favour the method of early active movements—the same procedure as one adopts with the sprained ankle. In the protruded disc group this form of therapy had no lasting qualities.

Specific exercises.—It is recognized that the assumption of the orthograde posture by man is achieved only with the accompaniment of relative incompetence of the spinal column. The breakdown occurs when the body attempts an excessive load, or when the body as a whole functions in an improper manner. Ligaments suffer sprain and strain because muscular action has been inadequate or not properly co-ordinated. Our therapeutic purpose is designed not only to strengthen the muscles which control spinal movement and stability, but also to restore by habit, a corrected posture.

During the war, while attending an R.A.M.C. course for company commanders at Cambridge, I was much impressed by a staff sergeant who instructed us in the manner of proper standing. He had us stand with the feet 6" apart and pointing forwards, then we were made to contract the gluteal muscles, to pull in the lower abdomen, and lifting the thoracic cage to incline the body forwards; this effected a tilting of the pelvis, removing the lumbar lordosis to a considerable degree. This manoeuvre instantly removed the strain and ache in those who had adopted the lordotic posture. The patient with this complaint can be made to feel the relief by passive movements in the examining room. He is instructed in postural exercises. Those with whom there is success in selling the idea get along well. The lazy or indifferent require other forms of therapy. In this not insignificant group, postural and remedial exercises are considered all important. Also in the immediate postoperative course of patients who have had a spine operation, special tension exercises are considered invaluable.

Immobilization.—In by no means every case can one hope to create an adequately strong back by exercise and posture alone. If the fault be that of functional imbalance, with decompensation, considerable success will attend a

really concentrated and strictly supervised regimen of corrective exercises. But when the trouble is due to structural changes, because of trauma, developmental anomalies or disease, additional support may be required. The sacroiliac belt, we feel, is not adequate protection, and it is our practice to provide a lumbo-sacral brace of the Harris or low Taylor type, in many of our lame backs. In spondylolisthesis, this or some other more permanent form of fixation is essential. In the group which I have called unclassified, it was sometimes used as a trial, to be returned if there was no benefit. In Marie-Strümpell arthritis, except in the early stages, it serves an important rôle in preventing deformity. In some of our intervertebral disc lesions, the patients prefer to have the protection afforded by the brace, claiming they cannot work without it.

This applies both to those operated on, and to those treated conservatively. It is the practice in the former to depend mainly on muscle redevelopment. It is only after they return to work and complain of inability to carry on that brace is issued. In the 26 cases operated on for a disc disorder, 8 have the brace. From a recent interview in each case, I was given emphatic assurance that the appliance enabled the patient to perform work that would be otherwise impossible. In those treated conservatively, over half were given a brace. A questionnaire was sent to these patients, and a study of the replies revealed only one who claimed that the brace did not help; this man is employed as the driver of a mail truck. In only one case was an operative fusion done following the disc operation. I feel that this is not the place to discuss the pros and cons of the combined fusion operation, but inasmuch as a considerable number of these patients have derived benefit from a modified form of support, it would appear that a more permanent stabilizing operation might be expected to give better results.

Manipulation has not featured importantly in the management of these people. At one time I would have treated many more of them by putting the anæsthetized patient through the full range of spine movements. But a study of the type of injury associated with the onset of symptoms in the intervertebral disc cases, one in which there is sudden and unprotected hyperflexion of the trunk, and recalling the

unhappy recordings of the disasters that have followed this manœuvre, have made me more wary. There is, however, a small group in which the presence of contracted adhesions between the spinous processes may be suspected. In other cases shortening of the hamstring muscles can be demonstrated. I am satisfied that in five cases of this series, the patient attributed his improvement to the manipulation.

The rôle of reassurance, combined with careful explanation and instruction should not be omitted. Many backs that are painful can still carry on with confidence when there is understanding above the shoulders. I have definitely appreciated the sense of relief exhibited by several patients when the matter had been fully explained to them.

It is not my intention to discuss the operative treatment of disc lesions. This series does, however, reveal some points that might be mentioned. It is claimed that the only positive proof of the presence of a protrusion is its demonstration at operation. In five of the 26 cases operated on, no disc protrusion was found. In one, a protruded disc was removed at a second operation at a neurosurgical centre, with relief of sciatic pain. In another, the intervertebral canal was unroofed to decompress a nerve which was obviously swollen and œdematous. A third case, in which multiple congenital anomalies were present, was found to have a fairly extensive lipomatous mass intimately attached to both dura and nerve root. A fourth was a very severe and rapidly progressing type of sciatica, demonstrating most of the features of a cauda equina tumour; he was thought to have a massive extrusion of a low lumbar disc. Operation revealed an arachnoiditis, and was followed by relief of severe pain, return of normal bladder function, and improvement which is steadily progressing. In the fifth case, there is no explanation except that if symptoms return (he was done during a quiescent stage), a second exploration may reveal the protrusion.

It follows that those cases classified as intervertebral disc lesions treated conservatively, may very well be improperly diagnosed. However, each case has sciatic neuritis, a low back which is distorted, particularly on bending, and a typical history. We prefer not to do myelographic studies unless the patient is coming to operation, but many of them in addition, demonstrated positive myelograms. Why then

are these patients treated conservatively? Some are in an older age group and have arthritis. The neuropsychiatrist has advised against doing others. And we feel that if it is at all possible for the patient to carry on at his work with only occasional periods of incapacity, he will probably be better off than many of the operation cases who are compelled to seek other types of work than ordinary labour.

Finally, a few words as to results. A questionnaire was sent out, and either a reply or a direct interview was obtained in 83% of the total. Of those who had returned to work following a disc operation, there were only two who could do full duty; one was a locomotive fireman, the other was doing electrical repair work. Each of the others claimed that he could carry on at light work only. All of the conservatively treated "discs" were working, but none at heavy labour.

TABLE II.

RESULTS

Disc operations sufficiently recovered to work 16	
Light work only	14
Full duty	2
Convalescent	8
Unheard from	2
Conservatively treated discs	
Light work only	11
Full duty	4
Unheard from	1
Traumatic strain	
Light work only	7
Full duty	1
Unable to work	1
Unheard from	3
Unclassified	
Light work only	8
Regular job	4
Unable to work	1
Unheard from	4
Brace did not help	2
Brace did help	4
Spondylolisthesis	
Brace enabled to work	3
Postural strain	
Improvement from exercises	
Extra brace support required	2

In no case was there dissatisfaction with the operation. "They would have it again tomorrow, if the pain returned", was a typical remark. In only one of the strain cases was there a reply that full duty could be performed. Periodic attacks of disabling pain were not uncommon. They were all working except one. Braces were issued to only two in this group; one reported that it made the condition worse, the other claimed some benefit from its use. In the unclassified group there was a greater proportion

doing their ordinary job with only mild backache than in any other. In two, a brace was tried and given up. Four of them expressed the conviction that they were enabled to work because of this support. The spondylolisthesis cases were all enabled to work because of the brace. The postural strain cases have definitely been improved by their special exercises; two of these are perfectly fit because of the brace. The cases of infection, bone injury, and osteoarthritis, reveal nothing of significance in regard to this study.

CONCLUSIONS

1. The labourer with chronic low back pain, with or without sciatica, has a serious disability. When a protruded lumbar intervertebral disc can be diagnosed, operation may not necessarily restore him to normal activity.

2. The diagnosis is difficult because of the varying clinical picture. The patient with recurring traumatic strain may be in the early stages of a disc lesion.

3. In spite of the unpopularity of the lumbosacral brace this study indicates that many cases of backache are improved by its use. In particular, in those cases who have had a laminectomy without subsequent fusion, and who have residual symptoms referable to the back, the brace may afford considerable relief.

4. A study of the nature of the trauma resulting in chronic back pain suggests that the best treatment may well be some form of prevention. The human species has a constitutional weakness at the lumbo-sacral junction. In order to compensate for this deficiency, a well planned and purposeful program of postural training is required. The lower part of the spinal column can thereby be protected against the excessive strain to which it is otherwise exposed. Perhaps this special training may form a part of the nation-wide program of physical fitness. Certainly it should be a very important feature in military training, and no soldier should be made to tackle the obstacle course without first learning how to protect his spine in falling and jumping: nor should he be allowed to march with a pack on his back until he has learned, by habit, to carry his body in the proper manner.

I am convinced that if industrial firms were to provide this training for their workmen, they would find a considerable saving from the grief

that, in many instances, follows intervertebral unneighbourliness.

77 Inglis Street.

RÉSUMÉ

La lombalgie, avec ou sans sciatique, constitue un sérieux handicap. Dans les cas de hernie discale il faut savoir que l'opération ne permet pas toujours le retour au travail antérieur. Le diagnostic clinique de hernie discale est parfois assez difficile. Le support lombosacré, —ceinture ou corset—, rend souvent de grands services, même chez les sujets qui ont subi la laminectomie. De l'étude des traumatismes lombo-sacrés il est permis de conclure que beaucoup peut être accompli dans la voie de la prévention, par exemple, par des exercices rationnels qui augmentent la résistance vertébrale et permettent une meilleure utilisation d'autres segments musculaires. Ces méthodes prophylactiques devraient être appliquées à l'entraînement des militaires.

JEAN SAUCIER

ELECTRIC SHOCK THERAPY IN A PRIVATE PSYCHIATRIC HOSPITAL*

A. L. MacKinnon, M.B.

*Assistant Medical Superintendent,
The Homewood Sanitarium, Guelph, Ont.*

THE literature on the subject of shock therapy is already so voluminous that one feels called upon to defend any attempt to add anything more. We felt that we might be justified in presenting this report of our results with electric shock therapy as this hospital holds a somewhat unique position in this country, there being no other private psychiatric hospital of comparable size in Canada. While the vast majority of our patients differ only in their social and economic backgrounds from those treated in public mental hospitals, we do admit a larger percentage of the milder cases especially in the psychoneurotic group. This article deals with our experience in treating 300 consecutive cases of all types over a period of approximately four years. All patients treated in this hospital with electro-shock therapy during that period are included in the series.

It seems unnecessary to dwell on our method of selection of cases for this form of therapy as it would appear to be basically the same as in other hospitals with the possible exception of the standard of physical fitness qualifying the patient to undergo shock. At the outset, we proceeded with caution and while we have

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lowered the barriers in keeping with the general trend, we still reject cases showing evidence of coronary artery disease or circulatory failure and also those with definite evidence of cerebral arteriosclerosis. We do not feel that age in itself is any contraindication to the treatment but our series included only six patients who were over 70 years of age and 14 between the ages of 60 and 70. It is our policy to look upon electro-shock as merely an elective procedure and not one which is to be undertaken lightly. It is not used routinely in any type of case but is given only when it may be expected materially to shorten the duration of the illness or alleviate symptoms which are unusually severe.

Immediate results.—An attempt has been made to express our results in tabular form. The

lowering the last shock but many of these patients were still in hospital. However, our records show that many of them continued to improve and were able to lead a reasonably normal life at home after a further period of hospital care. In many cases of this class, the home condition, rather than the benefit produced by shock, was the determining factor in deciding on the discharge of the patient.

Taking all classes of patients as a whole, the results can briefly be summarized by saying that one-third was recovered, one-third greatly improved, one-sixth slightly improved and one-sixth unimproved. Or, to simplify it still further the whole number could be divided into two groups instead of four, putting those recovered and greatly improved into one class which might be labelled as "successful results".

TABLE I.
RESULTS OF SHOCK TREATMENT IN SERIES OF 300 CASES, 219 FEMALES, 81 MALES
(Evaluated 21 days after last shock)

	Total No. of cases	Recovered	Greatly improved	Slightly improved	Unimproved
Manic depressive psychosis, depressed phase	98	46 (47.0%)	33 (34.0%)	13 (13.0%)	6 (6.0%)
Manic depressive psychosis, excited phase	37	16 (43.0%)	15 (41.0%)	3 (8.0%)	3 (8.0%)
Involucional melancholia . .	18	6 (33.0%)	6 (33.0%)	2 (11.0%)	4 (23.0%)
Reactive depression	31	11 (35.5%)	17 (55.0%)	2 (6.5%)	1 (3.0%)
Other psychoneuroses	34	8 (23.5%)	6 (17.5%)	12 (35.5%)	8 (23.5%)
Schizophrenia	60	9 (15.0%)	16 (26.0%)	14 (24.0%)	21 (35.0%)
Schizo-affective	13	4 (31.0%)	3 (23.0%)	3 (23.0%)	3 (23.0%)
Miscellaneous	9	1 (11.0%)	2 (22.0%)	2 (22.0%)	4 (45.0%)
Total	300	101 (34.0%)	98 (33.0%)	51 (17.0%)	50 (16.0%)

appraisal of the patients' condition for Table I was made three weeks after the last shock treatment had been administered. This period is nine days shorter than that suggested by Alexander,¹ but in our experience few patients have relapsed between the 21st and 30th day after the completion of treatment. Most of our early relapses have been in the first or second week. Improvement which took place beyond this 21-day period, we do not attribute to shock therapy. An attempt should be made to define what we mean by "greatly improved" and "slightly improved". It goes without saying that a patient classed as "recovered" is not only well enough to return home but is free from any disability of a psychiatric nature. Those patients classed as "greatly improved" are also able to return home but still show residual symptoms. Of the patients classed as "slightly improved" there was definite evidence of benefit at the end of three weeks fol-

This group constitutes roughly two-thirds of the whole, with the remaining third being classed as "unfavourable results". As is generally found, the best results were obtained in patients suffering from the depressed phase of manic depressive psychosis and the poorest results in schizophrenia. As there was a relatively small number of cases of schizophrenia in our series, we did not sub-divide them. However, our results pretty well parallel those of other observers² in that the best results were obtained in patients of the catatonic type, the paranoid type ranked second and little if any benefit was produced in those of the simple or hebephrenic types.

Likewise, we did not sub-classify the psychoneurotics except to show the cases of reactive depression separately as they do respond much better to shock than psychoneurotics as a whole. We found, however, that many patients in an anxiety state also responded well to this form

of therapy. It will be noted that our series contains quite a large number of psychoneurotics and we feel that our results indicate that the use of shock treatment in these cases is well worth while. Taking our psychoneurotics as a whole, 42 out of a total of 65 were classed as "recovered" or "greatly improved" while only 9 were "unimproved". We are in accord with the conclusions of Hamilton³ who reported a higher recovery rate and a shorter hospital stay in the case of psychoneurotics when electric shock was used in addition to other forms of hospital treatment.

The "miscellaneous" group consisted of 3 patients suffering from a paranoid condition,

well received a smaller number of treatments than those who responded poorly or not at all. In cases where patients were given two or more separate series of treatments, each series was considered as a separate undertaking. The smallest number of shocks given to any of our patients was three and this was the number administered to six patients. Thirteen patients received a total of four shocks each.

Rarely did the number of shocks given in one continuous series exceed 15, but in a few patients who showed a tendency to relapse, the total was much higher. One patient still under treatment has had 36 shocks in a period of seven months. The highest number of shocks

TABLE II.
AVERAGE NUMBER OF SHOCKS ADMINISTERED

	<i>Recovered</i>	<i>Greatly improved</i>	<i>Slightly improved</i>	<i>Unimproved</i>
Manic depressive psychosis, depressed phase ..	8.5	10.5	10.0	12.0
Manic depressive psychosis, excited phase	8.5	11.0	15.0	13.0
Involuntional melancholia	7.0	7.0	10.0	9.0
Psychoneuroses	8.0	8.5	7.0	7.2
Schizophrenia	12.0	13.3	13.0	13.0
Schizo-affective	7.6	11.0	14.3	15.0

TABLE III.
CONDITION AT JULY 1, 1947, OF 152 PATIENTS (OUT OF FIRST 210 PATIENTS) FOLLOWED FOR VARYING PERIOD—50 OVER 3 YEARS; 39 FOLLOWED 2 TO 3 YEARS; 63 FOLLOWED 1 TO 2 YEARS.

	<i>Total No. of cases</i>	<i>Recovered</i>	<i>Greatly improved</i>	<i>Slightly improved</i>	<i>Unimproved</i>	<i>Dead</i>
M.D. psychosis, depressed phase 53	34 (64.0%)	10 (19.0%)	3 (5.6%)	3 (5.6%)	3 (5.6%)	3 (5.6%)
M.D. psychosis, excited phase . 19	7 (37.0%)	7 (37.0%)	0	5 (26.0%)	0	
Involuntional melancholia ... 9	5 (46.0%)	2 (22.0%)	0	2 (22.0%)	0	
Psychoneuroses . 33	12 (36.5%)	13 (39.5%)	3 (9.0%)	4 (12.0%)	1 (3.0%)	
Schizophrenia .. 22	8 (36.0%)	1 (4.5%)	2 (9.0%)	11 (50.0%)	0	
Schizo-affective . 16	3 (18.7%)	6 (37.5%)	4 (25.0%)	3 (18.7%)	0	
Total .....152	69 (45.4%)	39 (25.7%)	12 (7.9%)	28 (18.4%)	4 (2.6%)	

3 with alcoholic hallucinosis, 1 case of G.P.I., 1 case of depression associated with disseminated sclerosis and one case of post-encephalitic psychosis. Two of the cases of hallucinosis were acute and responded well to treatment, one being "recovered" and the other "greatly improved". One of the paranoids also was "greatly improved". One case of chronic hallucinosis showed no improvement.

Number of shocks. — Table II shows the average number of shocks administered to the various diagnostic types. It is noted that a higher number of treatments was given to schizophrenics than to any other class of patients and also that the patients who responded

administered to any one patient was 48 in a period of eight months. This consisted of two separate series of 12 and 14 respectively and the remainder was given once weekly in the hope of controlling the symptoms. This patient was suffering from the paranoid form of schizophrenia. She had a pre-frontal leucotomy in June of this year and did well. She had reached the point where she not only failed to respond to electric shock treatments but was definitely worse after the last few treatments. It may seem that these numbers are unnecessarily small but we are definitely of the opinion that with few exceptions the patients who are going to respond to electric shock therapy will

derive the maximum of benefit from a total of ten to fifteen shocks. We are supported in this view by Gralnick² who said that "Courses of therapy which are extended beyond twelve to fifteen treatments, quite generally fail to produce a remission".

Late results. — If electro-shock treatment could be judged on the immediate results alone, it would rank as a modern miracle. However, many psychiatrists have undoubtedly made the mistake of displaying too much enthusiasm over the various forms of "shock therapy" as they have come into prominence. What we are really anxious to learn is—"What will be the long term result?" A number of follow-up re-

follow them over a sufficiently long period, to arrive at any conclusion on this subject but we attempted this year a follow-up study on our earlier cases. We were able to get information on 152 patients out of the first 210 treated in this series and their condition as of July 1, 1947, will be found in Table III. These figures are not particularly informative but would suggest that some of those originally classified as "greatly improved" had gone on to full recovery and that many of those originally classified as "slightly improved" had retrogressed in the interval between the time that the treatment was given and the time of the follow-up survey. It is realized that one is more apt

TABLE IV.
PRESENT CONDITION (JULY 1, 1947) OF THOSE PREVIOUSLY CLASSED AS
RECOVERED OR GREATLY IMPROVED.

	No. of cases following	Remaining well	Relapsed under 1 year	Relapsed after 1 year	Relapsed more than once
Manic depressive psychosis, depressed phase	44	33 (75.0%)	5 (11.5%)	6 (13.5%)	1
Manic depressive psychosis, excited phase	18	10 (55.5%)	5 (28.0%)	3 (16.5%)	2
Involuntal melancholia	5	5 (100.0%)			
Schizophrenia	13	10 (77.0%)	1 (7.65%)	2 (15.35%)	
Schizo-affective	6	2 (33.3%)		4 (66.7%)	
Reactive depression	13	10 (77.0%)	2 (15.5%)	1 (7.5%)	
Other Psychoneurotics	10	9 (90.0%)	1 (10.0%)		
Total	109	79 (72.3%)	14 (13.0%)	16 (14.7%)	3

TABLE V.
RESULTS OF ELECTRO SHOCK TREATMENT IN RECURRENCES

	Second course of treatment		Third course of treatment	
	Successful	Failure	Successful	Failure
Affective disorders	10	4	4	0
Schizophrenia	4	2	1	0
Psychoneuroses	3	1	0	1

ports have appeared in the literature but they are difficult to compare. However, we have the statement of Tillotson and Sulzbach⁴ that not only is the recovery rate much higher with electric shock in depressive states than with conservative measures of treatment, but also that the relapse rate is lower in a shock-treated patient than in a control patient. Opposing this is the statement of Salzman⁵ that relapses occur much earlier in shock-treated cases than in those treated with other measures. In his study of this aspect of the subject Salzman deals with schizophrenias and the manic depressive group.

We do not feel that we have a sufficiently large group of cases, nor have we been able to

to receive a report on a patient whose condition is good than on one who is in poor health. Accordingly, these figures might be less favourable if they represented the full number of 210 patients.

The four deaths listed in the follow-up report are accounted for as follows; one depressed patient went home unimproved and committed suicide soon after, one depressed patient went home recovered, relapsed 18 months later and committed suicide at the onset of the second attack; the third died of natural causes while mentally well; the fourth death occurred in this hospital and will be referred to later. However, we are perhaps more concerned at present with the fate of those who were classified three

weeks after the close of treatment as "recovered" or "greatly improved". Table IV shows that of 109 patients of these two categories whom we were able to follow, 79 or slightly over 70% remained well, 14 relapsed within a year after treatment and 16 more have already relapsed after remaining well for one year after treatment. Four patients had relapsed more than once. Of the patients of all categories who relapsed, 24 were given a second course of electro-shock (in treatment of the recurrence) and six patients received a third course. Table V shows that the results of these repeated courses of treatment are comparable to those obtained in the first instance.

Undesirable side effects.—While we had no deaths resulting directly from shock treatment, one death should be attributed to its indirect effects. This was in a woman 47 years of age, suffering from an anxiety state. She was in good physical health at the time of admission except for a chronic cough. Her temperature was normal and x-ray of the lungs did not reveal any abnormality. However, after four shock treatments she developed pleurisy and broncho-pneumonia and three weeks later, while convalescing from this condition, she died suddenly. There was no autopsy but the circumstances indicated death due to embolism. In the first year or so after instituting electric shock treatment, we routinely x-rayed the spine before and after treatment. A careful study of the post-shock x-rays showed what is sometimes called a first degree compression fracture of a vertebral body in 15 to 20% of the cases. However, the symptoms, when there were any associated with these findings, were of minor degree and cleared up promptly without bed rest.

In so far as fractures of this extent are concerned, we agree with Lowinger and Huddleson⁶ who state that "compressive spinal fractures are inconsequential". However, we did have two compression fractures of more serious degree, one occurring with the third treatment and one with the first treatment. The latter patient is not included in this series of 300 as we wished to deal only with those who were given what we considered a full course of treatment. Both of these severe fractures occurred in men and it seems significant that we have had no serious fractures in women, though our series includes approximately three times as

many females as males. Both of these patients made an uneventful recovery from the injury, but the one who had had only one shock was very slow to resume an active life due to his personality make-up. There was a dislocated shoulder in one instance, which was probably due to a faulty method of holding but I cannot recall any other complication of a mechanical nature which is worth mentioning. There is invariably, of course, a certain amount of loss of memory. This is more marked in middle-aged and elderly people than in the younger ones but all complain of it to some degree. We are now using the Liberson type of brief stimulus therapy machine and hope that the complaints of amnesia and confusion will be fewer than in the past.

In the treatment of the first 25 cases, we did not use curare at all but then began to use it in those cases where we felt the risk was increased. We continued to use it more and more extensively until it became a routine procedure, but like many others we discontinued its use something over a year ago and cannot say that we have noticed any change in the incidence of complications.

Length of illness before shock treatment.—There is one aspect of our results on which we probably should not offer an opinion as we have not studied it statistically, and that is the relation of the results of shock therapy to the duration of the illness prior to the institution of treatment. The idea seems to be prevalent that the best results are obtained when treatments are given early in the illness. In the affective disorders where shock is of most benefit, I think this is not true. The most startling results we have obtained were in those cases of affective disorder which had gone on for several months. It is quite possible that many of them were about due to recover spontaneously and electric shock provided the necessary stimulus to complete the job. However, one patient 60 years of age, who had been acutely excited for seven and a half years, recovered after three shocks and has now remained well for a period of eight months. This woman had shown no signs of spontaneous recovery, in fact the treatment in her case was given with little expectation of lasting results but in the hope that a very serious nursing problem might be somewhat relieved.

CONCLUSIONS

It was intimated earlier in this paper that, in our opinion, many psychiatrists had displayed undue enthusiasm over the merits of this form of treatment which, we must admit, is not founded on scientific principles. When we instituted electro-shock therapy in this hospital we were convinced of its usefulness but were not prepared to make the claims for it which were made by some of its proponents. Occasionally one has found in the literature reports of a more conservative nature. In 1945 Alexander¹ made the following statement; "These observations lend support to the belief that it is only in those cases of mental illness wherein recovery with the aid of other forms of therapy is possible, that electro-convulsive therapy acts to hasten the process." This may seem an ultra-conservative view but at the time that we began using this form of treatment (February, 1943) we felt that proof had not been offered for any more extravagant claims. As we proceeded, it was always in the hope that we would find evidence that this treatment was more effective than the above quotation would indicate. We have looked for signs to indicate that shock had saved some patients from a life of chronic mental illness and believe that we have found some but such a proposition is difficult to prove. For the present we are content to say that electro-convulsive therapy (1) offers a good prospect of greatly shortening the duration of a recoverable illness; (2) alleviates the symptoms in many cases in which it does not shorten the illness, thus making the patient more comfortable and materially relieving the nursing burden; and (3) lessens the danger of death from exhaustion and from suicide. Our conclusions on the value of electro-shock in general are comparable to those of Geoghegan⁷ whose excellent paper was read at a meeting of this society a year ago.

It is our opinion, from experience in treating mental illness both with and without the use of convulsive shock therapy, that this form of treatment is in a class by itself in regard to its effectiveness in shortening the duration of some psychoses. However, we do not consider that shock therapy alone constitutes a complete form of treatment for any patient. It is merely an adjuvant to be used judiciously along with psycho-therapy, occupational therapy and any other measures which our professional skill and

our common sense would suggest as being suited to the needs of the individual patient. Secondly, while we agree with the general view that depressions as a class give a better response to electro-shock than do other forms of mental illness, we have found that some depressed patients who did not respond to shock, have recovered spontaneously at a latter date. Thirdly, our experience has led us to the belief that results with electro-shock bear a definite relation to results obtained with other forms of treatment and that they depend, not so much on the diagnosis, as on the depth of the personality change. We have felt in some cases the patient's attitude to the treatment will affect the result. Thus, patients who become progressively more frightened of the shocks, derive less and less benefit from them.

There are still many questions in our minds regarding electro-shock: "Is it here to stay or merely a fad of the moment?" "Will we find in years to come that we have been doing more harm than good?" Only time can answer these and many other questions. In our opinion it represents the greatest single contribution to psychiatric progress in a generation. However, it is purely empirical and we hope that science will bring forth something better to take its place. Until that something better comes along we will continue to use electro-shock treatment wherever it offers hope of helping sick people back to health.

I should like to thank Dr. Baugh, the Medical Superintendent of Homewood, also Drs. Bunt and Burton of our staff who have given valuable assistance in the preparation of this paper. I am especially indebted to Dr. Bunt as he has been closely associated with me in the use of this form of treatment and has administered most of the shocks.

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RÉSUMÉ

Les électro-chocs permettent d'écourter la durée de psychopathies curables, atténuent la sévérité des symptômes dans certaines maladies dont la durée n'est, par ailleurs, pas modifiée, et diminuent le danger de mort par épuisement ou par suicide. Les E.C. ne constituent pas une thérapeutique en soi. Ils sont un corollaire de la psychothérapie, de la thérapie d'occupation et de toutes autres mesures utiles. Les mélancoliques sont les malades qui répondent le mieux aux E.C. Les malades qui craignent les E.C. semblent en tirer moins de profit que ceux qui s'y soumettent volontiers. Il semble s'agir d'une thérapeutique d'attente, et bien qu'elle soit empirique, elle rend de grands services.

JEAN SAUCIER

HUMAN RELATIONS AND INDUSTRIAL HEALTH*

W. Line, Ph.D.

*Professor of Psychology, University of Toronto,
Toronto, Ont.*

I SHOULD like to choose for discussion the following aspect of my topic: that there is an obligation placed upon medicine by present day circumstances to give a type of leadership in industry that so far medicine has apparently found difficult to give.

To illustrate my meaning, I turn first to what I believe is a rare and outstanding form of medical leadership. As a student of the social sciences, there has been nothing more dramatic in my experience than witnessing the sudden change in the outlook of military medicine during 1941 and 1942. Prior to that time, Canadian Army medicine was largely concerned with wounds, sickness, and sanitation. Then almost suddenly, directions began to be issued from the office of the D.G.M.S., with full general staff backing at the highest level, which implied such principles as the following: that scientific selection is a health matter; that illiteracy is a menace to health in a society demanding literacy for full adjustment and development; that training in all its aspects must be geared to mental as well as physical capacity and thus reflect a concern for individual human needs; that public relations policies are of professional concern to medicine; that V.E. day must be anticipated with full regard for the drastic change in emotional outlook with which soldiers would inevitably be faced; and so on.

In other words, the army society was in need of professional direction at the highest policy level and a major aspect of that direction was a medical responsibility in the interest of health. This outlook put a strain on military medicine; but despite imperfections, it gave us a glimpse of a magnificent potential. The significance of that experience should not be overlooked.

In industry today there are many problems demanding a like kind of professional medical leadership. In some senses the demand is more pressing, if only by virtue of the fact that whereas in the service there was, by and large, a oneness of purpose, in industry we have two

groups—workers and management. On the whole, the public accepts this interesting fact as being natural to an industrial democracy. It is true that if a citizen is partisan, he is dubbed leftist or rightist, with a certain amount of censure; but generally speaking, the groups are regarded as natural and helpful to social progress. Yet you as professional people know that there is great difficulty in communication between these two groups; so that in your own technical terminology, you would make a diagnosis of social pathology.

Let us turn first, however, to the very remarkable medical achievements in the whole field of human relations, particularly those which have come from psychosomatic medicine, the internist and the psychiatrist. Medicine has done great things in delineating the functional history of emotional ill-health; in delineating situation complexes that give rise to tension, fear, frustration, disappointment, and in pointing out the cumulative effect of this in causing physical and mental breakdown, accident proneness, repeating illness, etc.

Your discipline has for decades, if not for centuries, given evidence that most sickness has high emotional involvement, and much sickness is functionally (not organically) grounded. Medicine has developed a high degree of skill in relieving the tensions of the mal-adjusted, and alleviating the stress of individual situation-complexes by changes in the immediate social milieu. It has pointed up the significant fact that the work situation, the vocation, is all-important in determining personal mental health; and has demonstrated the causal connection between inter-personal stress and labour-management problems.

All this, and more, is to the good. But is it good enough? Can we afford to stop short at the point where industry is a medical laboratory? Yet medicine is in danger of stopping short—by its own attitude. From the layman's point of view, there appear to be domestic problems within medicine to be solved; as between internal medicine and psychiatry, for example. The situation that has arisen by virtue of the internist's attempt to incorporate psychiatric postulates and concepts, at a time when psychiatry is moving from the mental hospital to the community, is worthy of scrutiny in the public interest. The clinical approach—a wonderful research tool—is also a technique

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of practice, of individual therapy; and in the mental sphere, the danger is that it will stop short at the individual level. In the somatic field, the research insights, confirmed by clinical practice, are translated into institutional policies, and here, the Public Health voice is very strong in our culture. Yet in the psychosocial field, there appears to be some hesitancy in moving from clinical insight to public health policy.

For example, it was clinical medicine that pointed up the dynamics of parent-child relationships. Yet parent education is *not* a medical movement. Obviously it is a problem in group therapy; yet medicine, which alone is qualified to lead in this sphere, sits back and leaves parent education to others.

I find no indication that penal reform is a concern of the Canadian Medical Association.

Medicine proved that our sacrosanct school system leaves much to be desired in terms of mental hygiene; yet educational reform is left to the lay-enthusiast, who, at the same time, is viewed by medicine in terms of derision.

To return, however, to the positive side, medicine has given leadership by its emphasis on the human relations aspect of healthful development; on the psychological nature of illness and unease. To this fact must be credited the dynamism behind the current revolution in the social sciences. Sociology and social anthropology were formerly concerned with delineating institutional origins at the level of custom. Because of psychological medicine, they now translate institutional dynamics into psychological terms. They portray group-formation through the eyes of psycho-dynamics. Social philosophy is currently reaching out to medicine; witness Northrop's "The Meeting of East and West".

Psychology, which formerly based its experimentation on a "controlled" (and therefore unexamined) motivation, now sets its sails so as to discover the inner meaning of human needs. Not "reaction" nor "adjustment", but "development" is the primary motif. The potential here is great, however scant the present achievement.

The point at issue is the unquestionable one of the influence of psychological medicine in bringing about a revolution in the social sciences. To return to industry once more: we have had a century of the boss-phenomenon,

since the onset of the industrial revolution. Are we content to accept another century of boss-manship, with the control changing hands from management to worker? Medicine has clearly etched the scene of authoritarianism. It has demonstrated over and over again the dynamic sequence of authority—rejection—hostility—guilt; and the consequent vicious circle. By and large, we now live in a fear-society; atom bombs and biological warfare threaten. We could very easily be lulled to sleep under the blanket of government control. Are we content to leave the worker-management problem to lay leadership and political arbitration? Or is professional medicine to speak?

Part of the answer to this urgent question is already clear. Sociology, for example, is definitely on the move, and in the much needed direction. Studies are being made of our expanding culture with particular attention to industrialism and industrial trends. The dynamic changes in human relations as community gives way to institution; as the big little factory becomes the little big corporation; as urbanization creates an atmosphere of individual isolation, and so on; these matters are being given their rightful place at the forefront of industrial research. Psychology likewise is concerned about such matters as the disappearance of crafts in a mass production system; the premium that is placed upon speed in the fragmentation of manufacturing process represented by the conveyor belt. A work life largely constituted by repetition of a simple movement under the pressure of machine time control gives little place for the positive emotions of satisfaction of achievement and puts a premium on resentment and monotony, both of which are regarded by medicine as distinct threats to health. Even the labour union tendency to accept the disappearance of crafts and to organize its groups without much reference to personal skill and workmanship is similarly scrutinized through the eyes of the dynamics of human motivation. Difficulties of communication between industrial groups are being clarified by such researches as those of Elton Mayo, the Hawthorne researchers, M.I.T., the Chicago Committee of Industrial Relations, etc.

While all this is helpful and promising by and large, it suffers from a very serious handi-

cap of complete lack of medical leadership. Quite apart from the scientific demand for such leadership, medicine has established a professionalism the like of which has never been achieved by others. In its public relations it stays in a neutral zone. In industry it is able to assume a non-partisan rôle in a worker-management society, and this is all-important.

Without the active leadership of medicine in this sense, the social sciences in the industrial field will probably be content with stopping short at social diagnosis plus individual counselling and psychotherapy. They will work for those who are distressed or who are willing to pay for services rendered. The point is sufficiently important to warrant the statement that unless medicine is prepared to accept fully this challenge, even the Hippocratic Charter is itself in danger of going down to ultimate defeat and our hopes for democratic civilization with it.

RÉSUMÉ

L'industrie a besoin des conseils de la médecine; elle a besoin d'être guidée par elle. La médecine demeure trop à l'écart des entreprises publiques. C'est dans l'industrie qu'elle peut vraiment juger la situation sans préjugés, aussi bien dans l'intérêt du patron que dans celui de l'employé. Si la médecine n'occupe pas une place prépondérante dans le domaine industriel les sciences sociales perdent une grande part de leur portée pratique et elles ne s'adressent plus qu'à l'individu et aux cas isolés. C'est grâce à la médecine que pourront s'intégrer dans un même idéal démocratique les divers aspects de la sociologie et que tous les problèmes sociaux pourront être discutés et résolus sans parti-pris et dans le plus grand intérêt de tous et chacun. JEAN SAUCIER

THE MANAGEMENT OF ATOPIC ECZEMA CASES IN INFANCY AND CHILDHOOD*

John R. Ross, M.D., B.Sc. and
Alan Brown, M.D., F.R.C.P.(Lond.)

Toronto, Ont.

THE severity and chronicity of the skin lesions in eczema cases occurring in infants and children, is decreasing from year to year as our knowledge of the pathogenesis of these cases increases. That allergy plays a fundamental rôle in their development is now an undisputed fact, and a consistent allergic regimen of investigation and treatment should be employed in their management.

The cases occurring in infancy have a

* From the Hospital for Sick Children and the Department of Pædiatrics, University of Toronto.

different appearance and require a different approach from those affecting older children, and for this reason they will be dealt with separately. One should keep in mind, however, that according to Hill,¹ "There is a definite evolution from the acute, often vesicular infantile type of eczema to the thickened, chronic, lichenified neurodermatitis of older children; chronic atopic dermatitis or chronic atopic eczema seem reasonable terms to use for this condition".

Before making a diagnosis of atopic eczema in infancy, the case must first be carefully differentiated from the non-allergic seborrhœic dermatitis cases in which fine, greasy, white scales appear on the scalp and about the sides of the face. Such cases are usually of short duration and clear readily with bland ointments. The other skin lesion which occurs with moderate frequency in young infants between 2 and 10 months of age, and which at times present a picture closely simulating atopic eczema is erythrodermia desquamativa or "Leiner's disease".² In this disease practically the entire epidermis is involved except the palms of the hands and the soles of the feet. There is desquamation over the entire body; large, white flakes of epidermis separate leaving a beefy, red cutis. There is no vesiculation, however, as in atopic eczema and the skin seldom becomes moist. One of the distinguishing features of the disease is that the hands and feet are usually bluish in colour, cold and clammy, as emphasized by Hill. This disease occurs most frequently in bottle-fed infants but may also affect breast-fed infants. These cases are not allergic and need not be investigated with skin tests and other allergic methods. A high protein diet and the use of bland ointments will usually effect a cure.

ATOPIC ECZEMA OF INFANTS

An infant, under one year of age, who develops atopic eczema may show the lesions over any part of the body, with a special predilection for the face, extensor surface of the forearms, chest and legs from knee to ankle. In the more severe cases the lesion is at first maculopapular in character but soon becomes vesicular, swollen and œdematous, with breaking down of the cutis resulting in an excoriated moist surface. This lesion is then very susceptible to secondary invasion of bacteria or

mold spores which soon complicate the picture and a low-grade inflammatory process is set up. Still further damage is done by scratching and rubbing. With the institution of treatment in such cases the infective process may be cleared up, but the underlying allergic lesion may still persist and result in retarded healing and many recurrences from time to time.

A careful investigation must be made of the foods ingested and of the environment of the infant. If the infant is under 5 months of age, this is not very easily accomplished, since skin testing by either intradermal or scratch methods seldom shows significant or reliable reactions. Patch tests are also seldom of value at this age. The skin in this early age group does not usually show reactions with the injected or locally applied antigen, even though the ingestion of the same antigen may be the direct cause of the eczematous lesions. Occasionally such infants will show positive reactions to egg albumin, even though no egg has been ingested. The sensitization of these infants has taken place *in utero* as shown by Ratner^{3, 4} and others.

In these infants then the method of trial and error must be used in an endeavour to eliminate the food or environmental allergen responsible. The diet at this period is quite restricted in any event, so that it is not difficult to remove most foods from the diet, with the exception of milk. Ascorbic acid is used to replace the orange juice, irradiated ergosterol, or other synthetic vitamin D preparation is used to replace the cod liver oil concentrate. The cereal is changed to one which the infant has not previously been fed, such as barley or rice. Egg protein is strictly eliminated from the diet of the mother, if the infant is nursing. The experiments of Donnally⁵ and Smyth⁶ have fairly conclusively shown that egg albumen, ingested by the mother, may pass unchanged into the breast milk and sensitize the infant. The vegetables, if they have been previously fed, are withheld for some weeks. This leaves only the allergens of lactalbumin, lactoglobulin and casein in the diet to be dealt with. If the infant is receiving breast milk it should not be weaned except as a final elimination, since cow's milk is much more likely to cause sensitivity than breast milk.

Substitutes for milk have not so far been very satisfactory. Soybean flour preparations

have not the nutritional value of milk and while the occasional milk-sensitive infant may be cured of his eczema, his weight gain and general progress is not as satisfactory as one who is fed milk, especially if the soybean flour feeding is given for some months. Boiled evaporated milk mixtures are the most satisfactory type of feeding for most milk-sensitive infants.

Infants who are over six months of age and who show the skin lesions of atopic eczema, have usually developed fixed reagins in the skin to the specific allergens which are causing the eczema, and for this reason they give fairly reliable results with skin testing by either intradermal or scratch methods. Patch tests may also be of value in these older infants. It is commonly found, as mentioned above, that a positive reaction to egg or wheat may occasionally be demonstrated before these foods have been fed to the infant. The placental transmission of ovalbumin or wheat gliadin, or their ingestion through the breast milk is a reasonable explanation in these cases. The converse may also be true, that is, a negative reaction to intradermal or patch test may at times be demonstrated in an infant showing atopic eczema or gastrointestinal allergy, who is later shown by clinical trials to have definite milk allergy. Some infants with eczema may also show positive skin test reactions to foods which have no clinical significance.

Such apparently irrelevant skin reactions tend to discredit the value of skin testing in these young infants,⁷ but if they are evaluated in the light of the feeding history, clues may be obtained which will be of great assistance in their future management. If satisfactory positive reactions are obtained the particular foods should be completely eliminated from the diet of the infant, and care should be used in adding new foods to the diet. A trial period of at least a week should be given with the addition of each new food and the skin observed for exaggeration of the rash. It is advisable also to avoid contact with wool, feathers, silk and fur of any kind, even though these have shown negative reactions.

ATOPIC DERMATITIS (NEURODERMATITIS) OF CHILDHOOD

In the older child eczema takes on an appearance different to that seen in infancy. It

is chiefly characterized by papulation, rather than vesiculation. The common sites of the lesions are the antecubital and popliteal spaces, the wrists and the regions about the neck, but the distribution frequently does not follow these areas and is generalized. The itching is intense at times and the traumatic changes from continued scratching and rubbing, which is difficult to control in young children, complicate the picture.

Skin testing of older infants and children is usually quite satisfactory except in about one-third of the cases in which the skin does not react to the injected antigen even though it may be sensitizing the child. The causative foods may then only be determined by the use of elimination diets, which will be discussed later. Occasionally a child will react strongly to house dust, tobacco, feathers, wool, etc., and although he has no evidence of respiratory allergy, his skin eruption is caused by the continual inhalation of, or contact with, such substances. Such cases may be satisfactorily treated by injections of the specific allergen in gradually increasing dosages. It has also been found that wheat, milk or egg sensitive cases may be treated in a similar manner by injection with complete clearing up of the eczema. The oral method of desensitization by gradually increasing dosages of the offending food allergen, over a period of weeks, has also in many cases allowed the child to tolerate a considerable amount of that food without recurrence of symptoms.

The allergic contact-type eczematous dermatitis case, as described by Sulzberger,⁸ which is produced by contact of the sensitized skin with an allergen such as wool, silk, house dust, etc., is occasionally encountered in children. They must be correctly diagnosed in order to proceed with adequate treatment.

Routine skin testing of all cases of atopic eczema from 4 months to 14 years of age at this clinic, over a two-year period, have shown the following results. The tests were done in the majority of cases by the intradermal method.

GENERAL TREATMENT

The treatment will vary according to the findings on investigation of each individual case. If satisfactory skin test reactions are obtained, these foods and inhalants are carefully avoided. In the 21 cases in which skin tests

were entirely negative, no clues were provided for either the elimination of foods or the avoidance of contact allergens. In these cases, when they occur in older children, it is necessary to use the elimination diets of Rowe⁹ or Cobb,¹⁰ with the object of avoiding all foods which are most commonly the cause of sensitization. We

TABLE I.
ATOPIC ECZEMA CASES IN INFANTS AND CHILDREN

Intradermal reactions obtained in 85 cases; 64 gave positive reactions; 21 gave negative reactions.

<i>Foods</i>	<i>Total</i>	<i>Foods</i>	<i>Total</i>
Egg, whole	21	Asparagus	2
Wheat	20	Grapefruit	2
Cow's milk, whole .	14	Soy bean	2
Potato white	13	Rice	2
Orange	11	Flaxseed	2
Oatmeal	8	Rye	2
Tomato	8	Celery	1
Peas	7	Strawberry	1
Spinach	7	Pork	1
Beet	6	Beef	0
Onion	5	Lamb	0
Cocoa	5	Arrowroot	0
Peanut	5	Cauliflower	0
Chicken	5	Turnip	0
Corn	4	Bean (string)	0
Cabbage	4	Squash	0
Cod	4	Peach	0
Barley	3	Pear	0
Carrot	3	Apricot	0
Yeast	3	Apple	0
Salmon	2	Banana	0
Walnut	2		
<i>Inhalants</i>	<i>Total</i>	<i>Inhalants</i>	<i>Total</i>
Sheep wool	10	Cattle dander	1
House dust	8	Rabbit hair	1
Ragweed	7	Kapok	1
Chicken feathers ..	6	Pyrethrum	0
Duck feathers	6	Human hair	1
Cat hair	5		
Goose feathers	4	<i>Bacteria and moulds</i>	
Orris root	4	Staph. Alb.	1
Dog hair	3	Pneum. (i)	0
Tobacco	3	Pneum. (ii)	0
Canary	2	Monilia	3
Silk	2	Trichophyton	0
Timothy grass	2	Catarrhalis	0
Horse dander	1		

have modified these diets in some respects and find the following elimination diets very satisfactory.

SPECIAL RECIPES FOR ELIMINATION DIETS

Rice and oatmeal wafers.—2/3 cup oatmeal; 2/3 cup rice flour; 6 tbsp. sugar; 1 tsp. cream of tartar; 1/4 tsp. soda; 1/4 tsp. salt; 1 tbsp. mazola (or bacon fat); 1/4 cup raisins; 1/3 cup water. Mix the dry ingredients, add raisins, then add water and mazola. Beat thoroughly and drop on tins greased with mineral oil. Bake in a hot oven 400° F. for ten to fifteen minutes.

Cornmeal muffins.—3 cups cornmeal; 1/2 cup sugar or 1/2 cup corn syrup; 5 tsp. baking powder; 1/2 tsp. salt; 1 cup water or more if necessary; 1/4 cup mazola. Sift dry ingredients together. Add water and oil, beating thoroughly. Pour into muffin tins greased with mineral oil and bake in moderate oven for forty minutes (350° F.).

India pudding.—2 tbsp. cornmeal; 1 cup water; 1 tbsp. sugar; 1 tbsp. molasses; 1/4 tsp. salt; 1/4 cup prunes. Cook cornmeal 20 minutes. Add other ingredients. Pour into pan greased with mineral oil, and oven poach in a slow oven for 40 minutes. Serve with corn syrup.

The elimination diets are suitable to use with children over eighteen months of age. The procedure is to place the child on Diet I for a period of three or four weeks. If, at the end of this time, the rash has cleared or other symptoms of allergy have subsided, the child is

ELIMINATION DIETS

For the diagnosis and treatment of food allergy.
Wheat-free, milk-free, egg-free.

Diet I.	Diet II.	
CEREALS:		
Rice	Rice	
Rice crispies	Rolled oats and oatmeal	
Corn flakes	Cornmeal	
Puffed rice	Cream of barley	
	Puffed rice	
	Corn flakes	
	Rice crispies	
BREADSTUFFS:		
Rye crisp	Rye bisc. and Rye crisp	
Rye-vita	Ry-vita	
Rye bisc.	Rice and oatmeal wafers or	
Cornmeal muffins	drop cakes	
	Cornmeal muffins	
MEATS:		
Lamb	Lamb	
Beef	Beef	
	Liver (beef)	
	Bacon	
VEGETABLES:		
String beans	Lettuce	Beets
Squash	Carrots	String beans
Asparagus	Squash	White turnip
Lettuce	Asparagus	Celery
Carrots	Cauliflower	Soy bean
FRUITS:		
Lemon	Lemon	Grapefruit
Pears	Peaches	Applesauce
Peaches	Pears	Banana (well-
Apricots	Apricots	ripened)
Prunes	Prunes	Raisins
MISCELLANEOUS:		
Sugar	Sugar (brown	Molasses
Corn oil	or white)	Honey
(Mazola)	Corn syrup	Maple sugar
Salt	Salt	Bacon fat used
Corn syrup	Gelatin (Jello)	as butter
India pudding	Corn oil	Tabioca or sago
Gelatin	(Mazola)	cooked with
	India pudding	fruit
DRINKS:		
Lemon juice	Lemon juice	Ginger ale
Grape juice	Grape juice	Apple juice
Ginger ale	Grapefruit	
	juice	

After the patient has been taking Diet II for 4 weeks evaporated milk (15 ounces), water (25 ounces)—cooked 1 hour in a double boiler may be added to the diet.

placed on Diet II for a further period of four weeks or longer. Additional foods are then added one at a time, at weekly intervals, according to the child's tolerance. If on the addition of a certain food, such as milk or wheat, the allergic symptoms or signs recur within a few hours or days the child is considered to be clinically sensitive to that food and it should again be eliminated. The child is then maintained for months, or even years, on a suitable diet which is well tolerated. Care should be taken that adequate essential vitamins are added to such restricted diets, particularly vitamins A, B, and D. If the child cannot tolerate milk dicalcium phosphate should be supplied daily.

LOCAL TREATMENT

Apart from the procedures for carrying out the elimination of the sensitizing substances in the infant's diet and environment, it is necessary to proceed with local treatment to the skin. One of the first essentials is adequate restraint. If infection is present this must be cleared up by the use of skin antiseptics, such as ammoniated mercury ointment, penicillin ointment or painting with aqueous metaphen 1:2,500 for twenty-four hours or longer. If the skin surfaces are moist wet starch poultices are very useful, and soothing. These are tied in place under a face mask or bandages, and reapplied as they become dry, for a period of forty-eight hours.¹¹ Their deliquescent properties cause the skin to become quite dry, and in this stage it is ready for the application of some form of crude coal tar. Many ointments have been used in the treatment of these cases but the most efficacious types are usually found to be those containing crude coal tar or resorcin. An ointment has been devised and has been used extensively in this hospital with very gratifying results. The formula is as follows:

Crude tar	2.5%
Titanium dioxide	7.5%
Metaphen	1.0%
Butesin	1.0%
Zinc oxide	7.5%
Hydrosorb base	q.s.

This formula was compounded after considerable trial with the following points in mind. Crude coal tar is generally considered to be the most effective specific agent for the healing of eczematous lesions. The strength of this ingredient in the ointment may be in-

creased to 5% in the more severe cases. Titanium dioxide is one of the most effective dehydrating agents and when incorporated in a water miscible base will absorb much of the secretion from the vesicles and prevent crusting. Metaphen is used as a local antiseptic since these cases may readily become secondarily infected; and butesin tends to relieve the intense itching and prevent excoriation from scratching. This special ointment* has been used extensively during the past three years to treat the cases of atopic eczema, and has proved to be the most effective preparation so far used.

Prevention of further allergic complications in later childhood.—Allergic children who have shown atopic eczema in infancy are prone to develop asthma or hay fever when they become older. About one-third of such infants will develop other allergic manifestations in later life according to our records at this hospital. Advice may be given the parents regarding this possibility, and the things that should be carefully avoided in the child's environment with the object of avoiding sensitization to the inhalants which may later result in asthma. We have found, by repeating the skin tests in some cases, that if an allergic child, who has previously had negative skin reactions to inhalants, is given repeated exposures to animal danders or feathers, etc., he will within a period of some months or years develop positive skin reactions to these inhalants associated with attacks of asthma.

The positive reactions to inhalant substances in Table I will, in some cases, foretell the later development of asthma or hay fever in these children. In two of these cases the children developed ragweed hay fever twelve months and eighteen months respectively after the positive ragweed reactions were detected on routine skin testing. The prevention of the development of hay fever in later childhood is usually quite impractical because of the widespread prevalence of pollen, particularly ragweed, on this continent. If a choice of environment is possible, however, low pollen count areas may be advocated.

CONCLUSIONS

1. Atopic eczema of infants must be differentiated from seborrhoeic dermatitis and

* This ointment may be obtained from the Hospital for Sick Children, Toronto.

erythrodermia desquamativa before proceeding with treatment.

2. A complete allergic investigation should be completed in all cases of atopic eczema and a special regimen outlined for the treatment of each individual case.

3. Careful avoidance of sensitizing foods and inhalants together with adequate local therapy, materially lessen the severity and the duration of atopic eczema cases.

4. Prevention of the development of other allergic manifestations in later childhood is an important part of the management of such cases.

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NON-SPECIFIC URETHRITIS AND PROSTATITIS

E. Laurie Morgan, Surg.-Lieut., R.C.N.(R)

Toronto, Ont.

ARISING, I believe, out of lack of consideration given to non-specific urethritis and prostatitis by our medical schools, there exists an attitude of mind regarding the treatment of these conditions that definitely lacks purpose. It has not been uncommon, in my experience, to meet men who developed their infections in the early years of the war and have carried it until the present time, long since convinced that nothing more could be done, or that the condition would probably go away in time by itself, as often it does, but seldom to stay. It is far commoner to see acute urethritis cases receive the usual routine therapies, and be checked for cure without being advised about sexual hygiene or the use of alcohol, so that the man through ignorance may develop a non-specific urethritis or prostatitis which, while not conveying either to the doctor or to his patient the significance of the original infection, is nevertheless harder to treat and more time consuming, more subject to recurrence and certainly not lacking in infectiousness.

ETIOLOGY

The disease is generally considered to be venereal in origin; that is, the bacteria in question are picked up during intercourse. It takes no stretch of imagination to realize how vulnerable the male urethra can be. Even a healthy vagina is capable of excreting much discharge which is hardly sterile; but one that is associated with a cervicitis, a trichomonas infection or has been contaminated previously with a non-specific discharge, is capable of much pus formation. During intercourse the urethra must become contaminated with much of this discharge. Under normal circumstances the act of ejaculating or micturating clears the urethra and the cessation of coitus soon after ejaculation permits the tissues to resume their normal resting state. But in prolonged intercourse the rapid multiplication of contaminating organisms is increased. The etiology of the primary disease is then in part infectious, and in part mechanical.

However, one must never forget that non-specific urethritis and prostatitis may be secondary to disease elsewhere in the genito-urinary tract. It is well to remember that the prostate is the cesspool of the genito-urinary tract and a prostatitis may well reflect a stone, an obstruction or an infection elsewhere.

SYMPTOMATOLOGY

In taking a history of these cases, one is early impressed with certain features of the story; such as, previous gonorrhœa infections, which may smoulder away in many men after treatment; or intercourse which is prolonged or repeated several times in one night, or carried on when drunk, and followed up at frequent intervals with fairly heavy drinking or various forms of sexual excitement such as petting. Ultimately, often after a long incubation period, a mucopurulent discharge develops insidiously, present usually in the morning, often preceded or accompanied by a tickling or a true burning, occasionally accompanied by hæmaturia, frequency and urgency. If this discharge is neglected or inadequately treated, it may clear, but will subsequently recur. Perhaps it recurs only with drinking, and clears with a return to normal habits. Perhaps the patient develops low back pain, costovertebral pain or calf pain, or frequency and burning which did not exist before, or volunteers that

he has a penile discharge when straining at a bowel movement. We are now dealing with something more—this time a prostatitis.

MANAGEMENT

In dealing with these cases it has been customary to insist that the men report to the Clinic with a full bladder, that is, they hold their water after 0200. Little difficulty is experienced in this regard except for those cases having frequency. The clinic histories need not be long, but should adequately assess the previous infection, treatment and responses, the present symptoms and duration, and the habits of the patient with particular reference to sexual excitement and the use of alcohol. One should ever be alert to the presence of underlying disease processes: syphilis, tuberculosis, calculi, obstruction, and the presence of extraneous infections.

A general examination is made to exclude penile sores, lymphadenopathy, balanitis, tight foreskin, hypospadias, small meatus or meatus impinged upon by condylomata acuminata, epididymitis and costovertebral tenderness. Upon each visit, a careful stripping of the penis is observed, note is made of the character and amount of discharge and a smear made, even if it has been done once or twice before. A simple wire loop, flamed in an alcohol lamp after each using, will facilitate the making of smears.

The patient is then instructed to pass his water into two bottles, one inch into the first bottle, and half fill the second bottle. Half-pint milk bottles are very useful for this purpose. A little 10% acetic acid will readily clear the urine of the cloudiness that comes as a result of carbonate and phosphate crystals in alkaline urines. If the samples are seen immediately after micturition and before the specimen cools, little difficulty is experienced with urate crystals. A cloudiness that persists is usually due to pus, but occasionally the presence of many sperm will simulate pus. A microscope set up close by at all times, a box of clean slides and a pipette will quickly solve the problem.

The interpretation of the two-glass test may require a little practice. In my experience it is a useful test, but is not infallible, and in the case of prostatitis only exclusive examination of the prostate should be relied upon. In a typical anterior urethritis, uncomplicated and recent, the usual finding is this: two-glass test, No. 1, 1 to 4 plus large shreds—clear or slightly cloudy; No. 2, no shreds—clear. Under treatment the shreds will diminish in number, but it is difficult to say if they will disappear completely. Certainly some do, but in many cases, the shreds will persist in a small degree to reveal the presence of a past or present urethritis. As the urine spins in the second glass one has to watch very closely for the few fine shreds or clumps which are the suggestive evidence of a prostatitis. Rarely, however, does non-specific prostatitis make its presence known with much by the way of shreds or pus in the two-glass test.

When indicated, prostatic massage is performed. The technique is well described in most urological textbooks. One always has to decide whether he is being too rough or too gentle. The massage should be done fairly

slowly, with stress laid on even pressure applied to the gland with the ball and sides of the index finger, eight strokes on each side and one or two down the centre between the two lateral lobes being sufficient. It should be done after the patient has urinated, and thus washed the urethra clear of pus. Massage should not be performed oftener than every three days.

One should observe the size, shape and consistency of the prostate and also the degree of tenderness. Tenderness is probably the least accurate of these findings. However, palpation of the prostate in the majority of cases does not give evidence of the disease present. The small, hard or fibrosed prostate usually signifies chronic infection and one less likely to respond to treatment. A boggy prostate usually suggests an acute process of at least several weeks' duration. The seminal vesicles should not be forgotten. Normally indistinguishable from the prostate at the height of the gland, they are often found to be unusually tender and thickened. A few strokes of the massaging finger should be reserved for these organs.

A good massage is usually productive of some prostatic fluid which may however require a little waiting for or a little gentle stripping of the penis. The amount varies from almost nothing at all to ten drops or so. Most cases of failure to achieve fluid will be accounted for by constriction of the external sphincter which lies distal to the prostate gland. Better results are obtained if the patient is relaxed and does not experience pain, sweating, faintness, trembling or embarrassment. The precaution of stripping the penis just after micturition or just before the performance of the massage to squeeze out any water left in the urethra probably prevents dilution of the prostatic fluid. In those cases where no prostatic fluid is obtained, 25 to 30 c.c. of urine, passed right after the massage, centrifuged and examined microscopically will frequently give some indication if any infection exists in the prostate.

Grossly, the prostatic fluid may appear homogeneous and cloudy, or may contain clumps or shreds. Long thick shreds, or thick gelatinous fluid is matter expressed from the seminal vesicles and is often difficult to examine microscopically. Small clumps, found to be made up of pus cells on microscopic examination suggest involvement of the acini of the prostate gland, and usually accompany more chronic

infections. The number of pus cells varies directly with the degree and severity of the infection and also the thickness of the fluid under the cover slip. I always attempt to obtain the same size of drop. This drop, caught in the centre of a slide and covered with a clean glass cover slip, can be read under the high power of the microscope and a record made of the number of pus cells per high power field. It is usually considered that cell counts over 5 per high power field are abnormal, but one can consider up to 20 as normal. The majority of cases will leave little doubt, however, because often as many as 200 pus cells per high power field are seen. The borderline cases have to be assessed in the light of other findings. One should be loath to accept one prostatic examination as indicating the absence of disease, since repeated examinations often reveal the presence of infection.

TREATMENT

In the case of recent onset of penile discharge, with no evidence of Gram-negative intracellular diplococci on smear, with no past history or presenting symptoms of prostatitis and a two-glass test consistent with anterior urethritis, I put the patient on the following therapy: urethral instillations of acriflavine in glycerine, 1/1,000 daily or occasionally twice daily for seven days. In addition, I provide him with a printed sheet of sexual hygiene instructions. In doing so, I am assuming the patient to be suffering from an uncomplicated anterior non-specific urethritis. The glycerine is hygroscopic and designed to relieve congestion: the acriflavine is mildly antiseptic. I do not do prostatic massages in these cases until after the man has a good trial with this reagent—usually seven days, but rarely over ten days—for fear of producing a prostatitis where one does not already exist. If, however, the discharge does not clear up on therapy in this time, I assume that there must be some underlying cause and this assumption is rarely incorrect, the underlying cause being either a prostatitis or a vesiculitis. Collins¹ estimated that 60% of cases of non-specific urethritis were complicated by prostatitis.

One may desire to try some other reagent in the urethra such as potassium permanganate or silver nitrate 1/5,000 if the acriflavine in glycerine fails. At one time I was accustomed

to trying them all in rotation, but have since decided that if the discharge fails to clear up with what I consider the best of these, I must almost invariably be dealing with a deeper infection, and take steps to prove it. In the event that no deeper infection in the prostate, seminal vesicles or bladder can be found, irrigating solutions may be used in the following manner: potassium permanganate or silver nitrate daily, beginning with strength 1/5,000 and increasing in strength weekly by 1/1,000 until reaching a strength of 1/1,000. If during treatment the discharge stops, the irrigations are kept up for about one week after cessation of all symptoms.

With regard to instillations—correctly called injections—these are given with a rubber-tipped syringe, about 8 c.c. of solution being used. They are given after the patient has passed his water, the solution being retained for approximately three minutes and allowed to drip if necessary into a condom until such time as the man desires again to urinate. However, since acriflavine may be a little irritating and yet give rise to few symptoms, I do not encourage its being retained too long. Potassium permanganate and silver nitrate may be given as instillations or as irrigations. With irrigations, the solution is forced up the urethra with pressure derived from hanging the irrigating can about shoulder height. The solution is delivered through sterile glass irrigating tips, the lips of the meatus being pressed gently from the sides over the tip. If the patient is requested to relax as he would to urinate, the solution gets past the external sphincter into the posterior urethra and bladder. Several hundred cubic centimetres of solution may be employed in an irrigation. It probably makes little difference whether instillations or irrigations are used, or even whether the anterior or anterior and posterior urethra is irrigated. No attempt is ever made to prevent irrigating solutions from invading the posterior urethra. Instillations, however, should, I feel, be limited to the anterior urethra and just enough solution used to fill it adequately. At all times, solutions, syringes and solution containers should be sterile. It is perhaps advisable to make up acriflavine in glycerine every ten days or so, as it is thought to deteriorate.

All cases of urethritis should be rechecked about three weeks after completion of treatment. At this time a prostatic massage is done,

and the prostatic fluid examined. While it has not been the practice to pass sounds on all cases routinely at this stage, this provocative test is worth considering as a test of cure in personnel who are being sent to sea or isolated bases.

Those cases which are found to have a prostatitis or prostate-vesiculitis fall into two groups: (a) those who require intensive treatment in hospital, and (b) those who can be treated in the out-patients' department. The majority of cases are treated in hospital as the results are more certain and the duration of treatment is far less. Treatment in the out-patients' department is usually reserved for persons with fibrosed prostates or clumps of pus in the prostatic fluid who are not expected to do well on the intensive therapy, and those who are on course and cannot see their way clear to coming into hospital for a week or two. During the cold weather I tend to treat most of my cases in hospital.

Intensive hospital treatment consists of: (1) 4.0 mega units of penicillin (40,000 q. 3 h. x 100). (2) Sulfathiazole, 2 tablets q. 4 h. x 5, for three days and thereafter three times daily for the balance of two weeks. (3) Daily short-wave therapy to the prostate (20 minutes). (4) Daily irrigations of anterior and posterior urethra with potassium permanganate or silver nitrate, 1/5,000. (5) Twice weekly prostatic massages. (6) Twice weekly intravenous mapharsen, 0.06 gm.

The intravenous mapharsen is given in the minority of cases and restricted to those who show no organisms in the urethral smear, or to those who are least likely to benefit from the other treatment above. Some people are impressed with its value. I am unable to say whether or not it has helped my cases.

Under treatment, it is customary to find an increase in the prostatic cell count early in treatment, though this subsequently falls to normal or close to it by the time treatment is completed. I would like to think that the cell counts of all my cases returned to normal and could be then rated as apparent cures. This, however, is not true, but in all except a very small percentage, the patients were relieved of their symptoms including their discharges. When one sees cases who have been "dripping" for months, and sometimes for years, "dry up", one is impressed and pleased even though the cell count is not all that could be desired. Cases which have relief of symptoms but whose cell counts persist outside normal limits are classified as improved only. Only when a case reports back at the end of three months with a normal prostatic fluid is he considered a cure.

In the out-patients' department, patients receive for their prostatitis daily irrigations of

potassium permanganate or silver nitrate 1/5,000, the solution being increased in strength weekly by 1/1,000 until strength 1/1,000 is reached, twice weekly prostatic massages, and in the warm weather, daily short-wave therapy. Short-wave therapy given in cold weather seems to have no effect unless the patient is confined indoors. Occasionally when using any irrigating solution one will find evidence of chemical irritation. Whenever undertaking any of these long term courses of irrigation it is perhaps advisable to stop about two weeks later to watch the response for a week or so before carrying on. Sometimes a persistent discharge will clear spontaneously when treatment is stopped.

All my cases receive the following instruction sheet, generally with the more pertinent statements scored in some fashion. These instructions, I feel, are half the battle. In my experience, naval ratings will carry out these instructions and do not feel them too severe. In the more chronic cases the two-month periods referred to may well be increased to three or even four months. It is my impression that the majority of recurrences or failures have been traced to negligence in carrying out these instructions.

ROUTINE INSTRUCTIONS FOR GENITO-URINARY PATIENTS

1. Avoid all sexual excitement such as intercourse, masturbation, dancing, sexy thoughts and obscene books, for two months after treatment. Sexual excitement will evoke a reflex congestion of the genital organs which will impede your progress indefinitely.
2. Avoid the use of alcohol for two months following treatment as it will do the same.
3. Drink lots of water as the resulting increased urinary output will help wash out the infection.
4. Avoid sauces, pickles, mustard, spices and fizzy drinks as they irritate the affected tissues.
5. Keep your body warm. Avoid unnecessary exercise. Do not wear tight-fitting jockey shorts.
6. Do not repeatedly examine yourself. Avoid too great an interest in your progress day by day.
7. A penile discharge is usually pus. Watch your eyes. Wash your hands carefully each time you touch your penis.
8. Condoms and V-Packettes are available in quantity in the Clinic or Sick Bay. If you cannot practise restraint, practise discretion.
9. You are hardly likely to be rendered sterile, impotent or "triggerish" by your infection. Such matters are better discussed with your M.O.
10. Report to the G.U. Clinic at 0900, always with a full bladder, that is, no water passed after 0200 at the latest.
11. If you contracted gonorrhœa and are treated with penicillin, remember that you may have picked up syphilis too, a fact that may be masked for a variable period up to six months by the use of penicillin. In order that this may not go unnoticed, follow the post-penicillin regimen: Blood tests every two weeks for two months, then every month for the next four months.

In addition to this rather stereotyped approach to the subject of non-specific urethritis and prostatitis, one will naturally find indications for further investigation, routine urinalyses, intravenous pyelograms, cystoscopies, culture of pus and urine, 24-hour urine sample for tubercle bacilli, patch tests, chest plates, x-rays of prostate, fasting blood sugars, residual urines, Kahns, dark fields, etc., and need for other treatment to meatal warts, balanitis, phimosis, cystitis, epididymitis or a calculus, and even a tonsillitis or sinusitis. When non-specific urethritis and prostatitis is complicated by such other acute diseases as epididymitis and cystitis, it is perhaps better to withhold treatment to the urethra and prostate for two weeks or so until the acute process has died down.

COMMENT

Because of the dangers of chronicity and recurrence and a focus of infection, and because too of their infectiousness and complications in the form of epididymitis and cystitis, I strongly advocate that all cases of non-specific urethritis and prostatitis be taken seriously and given every chance to get better as soon as possible. In the long run this is the cheaper and less time-consuming method. On the other hand, I condemn the practices now rampant of giving five shots of penicillin just to make sure it is not gonorrhœa, of giving a few "days' sulfa drugs and predicting a happy result, and of advising the so-called test of cure for gonorrhœa, "Go out and get drunk and see if your discharge comes back". There is definitely no place for such lackadaisical thinking in the handling of the penile discharge.

I am much indebted to Dr. C. L. Gosse, Urologist, Halifax, N.S., whose guidance made this article possible.

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30 Glenfern Ave.

"If it is more difficult in the field of general practice to determine the qualifications for high position and for distinction, that means only that we have not yet understood as fully as we should, and as we hope we shall, the height and the depth, the length and the breadth, of the relationship between patient and physician, which relationship is one of the most profound and most difficult of definition in our human experience."—Dean A. M. Schwitalla.

CASE REPORTS

ACUTE DILATATION OF THE HEART*

S. T. Laufer, M.D.

Halifax, N.S.

Reports of fatal coronary artery disease in young people have recently drawn our attention to the possibility of complete absence of symptoms of coronary artery disease, even in those cases in which very advanced lesions of the myocardium were present at autopsy. Older myocardial scars, indicative of previously sustained lesions, were observed in a great number of cases, yet without any history of their development.

Apparently also in the non-fatal cases the involvement of the coronary artery system may occur silently and may therefore remain unrecognized unless discovered incidentally. Such a case has come under our observation and is briefly reported because of its rarity. Another reason for this report is that the findings in this case might represent one of the clinical manifestations leading to the scar formation observed in fatal cases at autopsy.

Private A.G., aged 27 years. The main items of the history are as follows: in 1941, at the age of 21, he joined the army and later saw service in Germany and Holland and was in the thick of the fighting for three months, but never wounded. The past history is irrelevant. His parents are living and apparently in good health.

In December, 1945, a diagnosis of sero-positive primary syphilis was made and he was treated with 2.4 million units of penicillin and with seven injections of mapharsen. Since May, 1946, his serological tests have remained consistently negative. On September 5, 1946, a diagnosis of non-specific urethritis and prostatitis was made in an army hospital and between October 22 and November 20, he received 4.0 million units of penicillin. During this period he also was treated for four days, with sulfadiazine, but this treatment was discontinued because of crystals in the urine. At this time the patient felt very well.

On September 4, a chest film was taken and showed no apparent cardiac enlargement. During his hospitalization from that date until November 21, the hospital chart does not show any abnormalities of pulse or temperature, nor were any complaints recorded. He was discharged to his home then and spent his sick leave delivering vegetables for his father's store. He did not notice any shortness of breath, pain in the chest or swelling of the feet or ankles, though he frequently had to climb stairs.

On December 12, a chest film was taken for the purpose of demobilization, and gross cardiac enlargement was shown (Fig. 1A). He was therefore readmitted to hospital for further investigation and remained there until January 30, 1947. A repeat chest film, taken on December 20, showed that the heart had regained its normal size (Fig. 1B). Examination on

admission showed the blood pressure to be 130/105 and there was a pulmonary systolic murmur, grade 2, audible over most of the precordium. No other abnormalities were present with the exception of a moderate blepharitis and marginal gingivitis.



An electrocardiogram was done on December 17, with only one lead, IV F. This (Fig. 2A) showed left ventricular strain with elevation of the ST segment and unusually high T waves in IV F. The electrocardiogram was repeated on January 3 and was practically identical, with the exception of a biphasic T wave in lead III and unusually high, peaked P waves in the same lead and an ST elevation of 2 mm. in lead IV F (Fig. 2B). The very rapid return of the heart to normal size with the apparent absence of clinical symptoms were the reasons for the further and more detailed investigation.

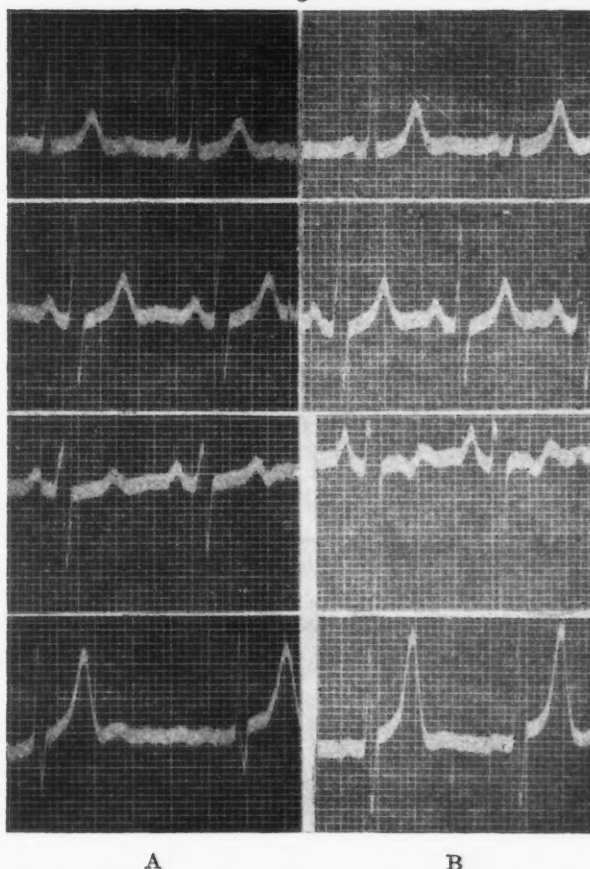


Fig. 2.—(A) December 17, 1946. (B) January 3, 1947. With CF.

Physical findings.—The patient weighs 135 pounds and is 5' 7" tall. He looks his age, is quite co-operative, is placid and evidently mentally retarded. The eye grounds show thin tortuous arteries with increased light

* From the Department of Medicine, Halifax Infirmary.

reflexes. Ear, nose, throat and chest examination is normal. The extremities are warm and the peripheral vessels easily palpable. On examination of the heart no circumscribed apex pulsation is palpable and auscultation reveals the presence of a loud, rather dull first sound followed by a low pitched second sound over the

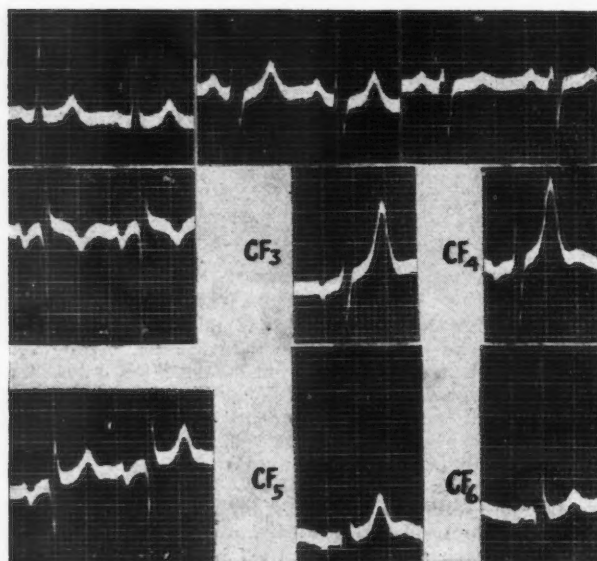


Fig. 3.—Electrocardiogram on January 17, 1947, with CF_1 , CF_2 , CF_3 , CF_4 , CF_5 , and CF_6 .

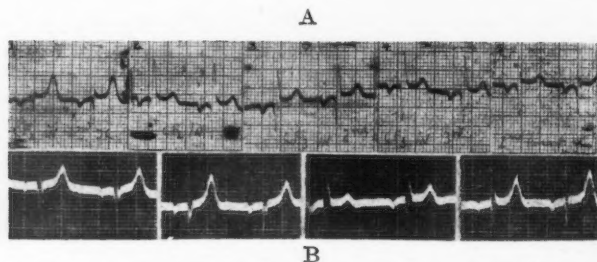


Fig. 4.—Electrocardiogram in the vertical line of CF_2 and CF_3 . (A) taken January 20, 1947; (B) on January 29, 1947. (1 and 2: CF_2 in 2nd and 3rd; 3 and 4: CF_3 in 2nd and 3rd I.C.; 5: 2nd right parasternal.)

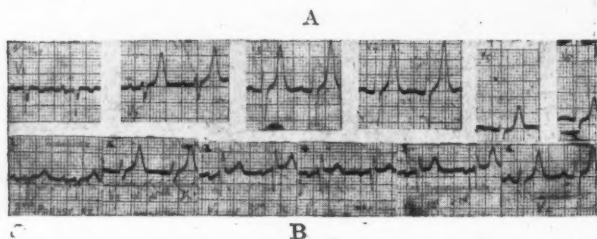


Fig. 5.—(A) Wilson leads (V_1 to V_6) and (B) special registration in the vertical line of V_2 and V_3 in the second and third intercostal space. (1: 2nd right parasternal; 2 and 3: V_2 in 2nd and 3rd; 4 and 5: V_3 in 2nd and 3rd I.C.; 6: V_E .)

apex. Towards the base the first sound becomes louder and the second sound accentuated. No murmurs are audible. The blood pressure is 128/70 right and 128/62 left; recumbent and standing 118/80, each arm. Nothing abnormal is found on the examination of the abdomen, back and extremities, skin and nervous system.

Laboratory investigation proved negative. Urinalyses and hamograms were repeatedly normal. Blood Wassermann and Kahn tests were twice negative. Kidney

function was normal, with non-protein nitrogen 30 mgm. %. Serum cholesterol was 184 mgm. %. Cerebrospinal fluid was normal. The lower genito-urinary tract investigation was negative.

Unfortunately no electrocardiograms are available before December 17, because the patient never complained of any cardiac symptoms.

On January 17, 1947, the electrocardiogram was repeated with chest leads CF_1 to CF_6 being done. Other special leads, recorded in the vertical line of CF_2 , CF_3 , V_2 and V_3 , were done in the second and third interspaces (see Fig. 3, 4 and 5). Chest leads CF_1 and CF_2

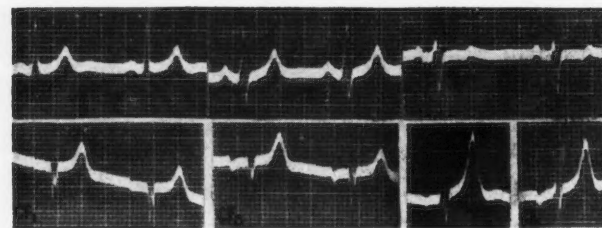


Fig. 6.—Electrocardiogram on January 29, 1947. Note changes of CF_1 and CF_2 if compared with electrocardiogram of January 17, 1947.

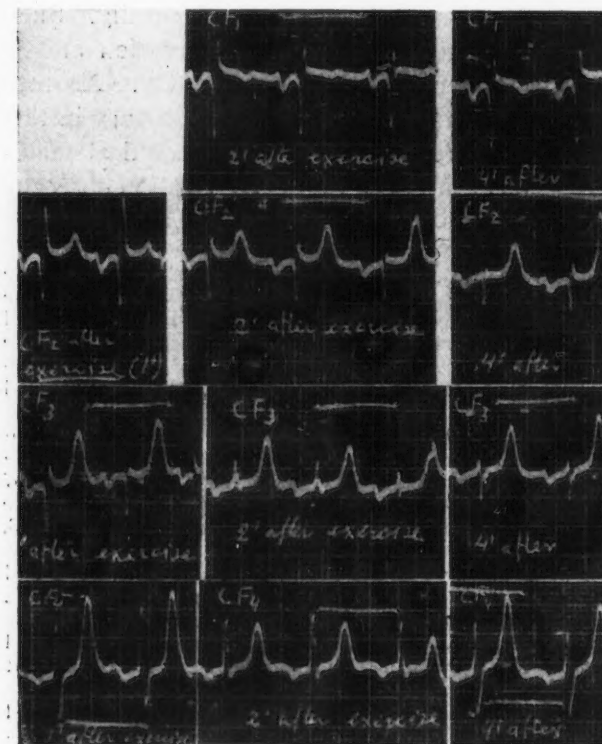


Fig. 7.—Exercise test, January 20, 1947. Only chest leads.

(Fig. 3) show a deep Q wave (-10 in CF_1 and -7 in CF_2). There is a low R_2 wave in CF_1 and $+6R_2$ in CF_2 , where the T wave is positive. The T waves are unusually high in leads CF_3 and CF_4 , which also show deep S waves and some slurring in CF_5 ; and CF_5 and CF_6 show rather high T waves and a high voltage of the QRS complexes. An occasional premature beat arising from the septum is also registered. The special chest leads corresponding to the vertical line of C_2 and C_3 in the second and third interspaces show also Q waves and rather high R_2 waves in all but CF_2 in the second interspace level. A lead registered in the second space to the right of the parasternal line reveals a deep Q wave and a low R_2 with slight elevation of the ST segment (Fig. 4A). The V

lead at this level reveals a marked notching of the ascending limb of the QRS (Fig. 5B). Wilson leads also show a Q wave in V_1 with the form of a capital "W" while in V_2 a low R_1 and R_2 are visible, so as to give the QRS complex the appearance of a capital "M". The T wave is unusually high in V_3 (Fig. 5A). On January 29, a fourth electrocardiogram was taken. While the limb leads are similar to the electrocardiogram registered on January 3, the chest leads show changes if compared with the former electrocardiogram taken twelve days earlier. CF_1 now shows an upright T and a QRS of the form of a W, the high R_2 and the dome-shaped ST have disappeared; the same is visible in CF_2 , CF_3 and CF_4 show hardly any changes (Fig. 6). Registrations in the vertical line of CF_2 and CF_3 also show changes, especially those taken at the level of the third interspace; the high R_1 in CF_2 of January 20, has disappeared in the electrocardiogram of January 29 and the QRS complex has now the form of a W, the T wave has become higher. CF_3 in the third interspace, being farther away from the necrotic focus shows less changes; R_2 is not as tall and a small R_1 is visible (1 mm.; Fig. 4B). All these changes may be considered indicative of an incompletely healed antero-septal infarction.

An exercise test was done on January 20 and shows changes when compared with the electrocardiogram at rest. Only the chest leads are recorded here (see Fig. 7). CF_2 shows a Q wave one minute after exercise whereas at rest no Q wave was present. Two minutes after exercise the ventricular complex in CF_2 has changed considerably from that taken at rest, for there is no S wave and marked slurring is present. CF_4 also shows some changes at this time. In conclusion, the changes observed following exercise (running up and down 2 flights of stairs four times) are further evidence of an impairment of the myocardium such as is seen in cases of coronary insufficiency.

To summarize, this 27 year old man presented a transitory (reversible) enlargement of the heart without any clinical symptoms. Careful electrocardiographic examinations showed changes suggestive of a silent antero-septal infarction as the underlying cause. Evidently as a result of the myocardial involvement he developed an acute dilatation of the heart, which subsided either with rest or because the subacute lesion had healed. A diagnosis of early arteriosclerotic heart disease with features suggesting a subacute antero-septal infarction was made.

DISCUSSION

French, Dock¹ and Poe² have called attention to the presence of old myocardial injury, such as scarring, fibrosis of the myocardium in a large number of their cases with fatal coronary disease which indicate that in these cases features of myocardial involvement must have been present sometimes at an earlier date yet without accompanying clinical symptoms. French and Dock make the statement: "It seems safe to conclude that in this age group undiagnosed and undiagnosable organic disease due to coronary arteriosclerosis is much more frequent than is recognized".

Accordingly, the present case is of interest because it represents one of the manifestations of the myocardial involvement in cases of this type, which evidently occur not only silently but without any clinical evidence of cardiac involvement. Only by a routine x-ray examination was a cardiac lesion suspected here, while the reversible nature of the enlargement served to warrant a more detailed study. The electrocardiograms indicate the presence of a partially healed myocardial infarction of the antero-septal type (probably sub-endocardial) in our opinion. Further evidence is seen in the eye-ground changes, in the presence of an elevated diastolic blood pressure on re-admission, and the special aspect of the aorta on x-ray examination.

Here, as in the fatal cases of advanced coronary artery disease in young individuals, the total lack of symptoms or clinical signs of any kind is striking. This is further borne out by the greater material of fatal coronary disease reported recently^{1, 2} and by earlier reports in which death occurred with the first attack.^{3, 4} A small number of cases is reported to have survived the initial attack. In this smaller group the symptoms of coronary artery disease naturally drew attention to its presence and the cases were then properly diagnosed. However, silent coronary artery disease in young people does escape our attention since there are frequent findings of old fibrotic scars in the myocardium, which are never suspected until they are incidentally found at autopsy.^{1, 2} In this regard the case under discussion may be a good example. It appears evident that advanced coronary artery disease in young people not only may lead to sudden death without previously noted symptoms but that greater involvement of the heart and even considerable enlargement as a result of coronary artery disease may occur without clinical symptoms.

CONCLUSION

A case of marked reversible cardiac enlargement in a young man with electrocardiographic evidence of a partially healed antero-septal infarction of the left ventricle is reported. The onset and course of the illness remained silent and clinical signs of impairment of the cardiovascular system were lacking. The case was discovered during routine x-ray examination. The absence of clinical symptoms in young men with advanced coronary artery disease is thus

noted and correlated to the pathological finding of old myocardial injuries in the fatal cases.

NOTE.—Since the preparation of this paper another case of a 20-year old man with very similar features was observed. Here the progressing changes of the electrocardiogram were followed for one month until the signs of the antero-lateral infarction of the left ventricle had totally disappeared. Cardiac dilatation was very marked during the acute stage. Subjective symptoms referable to the cardio-vascular system were lacking.

I wish to thank Surg.-Com. R. A. G. Lane, R.C.N., for his generous assistance in the preparation of this paper.

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HYPERTENSION DUE TO A TUBERCULOUS AUTONEPHRECTOMY

H. Ostry, B.Sc., M.D., C.M.

Colonel Belcher Hospital, Calgary, Alta.

The majority of cases of hypertension due to a unilateral renal lesion, are patients with chronic atrophic pyelonephritis. The following case is presented because the lesion was tuberculous, an autonephrectomy. It appears to be the cause of the hypertension, as the blood pressure has remained normal after nephrectomy.

The patient was a 37-year old male, of short stocky build, somewhat on the obese side. He first began to complain of headache, indigestion, hot flushes, and shortness of breath in 1944. The onset was insidious, occurring while overseas in Italy. At that time, an elevated blood pressure was noted. In October, 1946, he was treated medically for hypertension. The blood pressure at that time was 185/110 sitting, and 160/100 lying down. Renal function tests, blood studies, and electrocardiogram were normal. The blood non-protein nitrogen, was 31.5% and sedimentation rate 5 mm. Urinalyses were also negative, except for an occasional time, when up to 30 white blood cells per high power field were found.

In May, 1947, he was admitted to the medical ward of the hospital, still complaining of headaches, hot flushes, ringing in the ears, and numbness in the left leg and left arm. He could get along, if he took things easily. The eyegrounds were examined by the eye, ear, nose and throat specialist, who found them normal. Urinalyses were negative. The blood pressure after resting was 155/100 mm. mercury in the left arm, and 160/100 in the right arm. The heart was normal. The haemoglobin was 98%, white blood cells 9,500, sedimentation rate 3 mm. In the course of rechecking his general condition, the internist ordered an intravenous urogram. This revealed a normal left urogram, but no excretion of pyelographic medium on the right, and what appeared as a haziness, probably calcification, in a non-functioning right kidney. When this was discovered, he was referred to the urology service for complete genito-urinary investigation.

On May 16, 1947, he was cystoscoped. A normal-looking bladder was found, except that the mucosa around the right ureteral orifice was slightly swollen and hyperemic in appearance. A ureteral catheter was easily passed up the left ureter, but the catheter could not

be passed beyond the right ureteral orifice. Cystoscopy was again performed on May 19, 1947, hoping a ureteral catheter could be passed up the right ureter, but the attempt was unsuccessful, as before. Previous to cystoscopy, urinalyses were negative most of the time, but on a few occasions as many as 30 to 40 white blood cells per high power field were found.

On May 27, 1947, a right nephrectomy was performed. Blood pressure recordings, postoperatively, were as follows: May 29, 120/80; May 30, 115/75; June 2, 110/70; June 3, 100/60. After two hours out of bed, 108/68; June 8, 100/70; August 9, 100/60. The blood pressure has remained invariably normal to date. About June 16, 1947, he again began to complain of some headache and hot flushes. However, the blood pressure has stayed invariably normal. He is a worrying type of individual, and has family problems to contend with, so we have ascribed the complaints to this.

Pathologist's report (Dr. J. Duffin).—A right kidney, opened when received, the kidney is of average size. It shows numerous cortical scars and depressions, and renal fat tissue is intimately adherent to the capsular extremity, the lumen is completely obliterated by scar tissue. More proximally, it widens into a somewhat dilated pelvis, which seems ulcerated, and whose surface is covered with a thick layer of putty-like material. Very little, in fact much less than 10% of renal parenchyma remains. The kidney has been converted into a series of cyst-like spaces, measuring 1.5 cm. in diameter, and filled with putty-like material showing areas of calcium deposition. At the lateral border of the kidney, these coalescing cyst-like areas have extended right to the capsular surface.



Microscopically, this is the classical picture of a tuberculous kidney, which has undergone autonephrectomy due to an obliteration of the lumen of the ureter. It is a far-advanced ulcero-cavernous type of fibrocystic tuberculous. The cyst-like spaces and the kidney pelvis and upper ureter are lined by tuberculous granulation tissue. Diagnosis, fibrocystic tuberculous of the kidney (ulcero-cavernous type), tuberculous ureteritis and pyelonephritis.

It is interesting to note that repeated detailed questioning revealed that never at any time in his life had the patient recalled any history of frequency of voiding, nocturia, burning on voiding or dysuria. There was no history of tuberculosis in himself, nor in members of his family. There was no history at any time, of genito-urinary disease.

SUMMARY

A case of autonephrectomy due to renal tuberculosis with hypertension, is presented. The patient has been relieved of his hypertension by nephrectomy. However, he still has some of his symptoms, such as headache, hot flushes, etc. As he is a neurotic type of individual, persistence of these symptoms has been ascribed to this. Whether the blood pressure will remain normal, is yet to be seen. It will probably eventually become elevated again, as the lesion has been present for too long a time. An interesting feature of the case is the complete lack of symptoms referable to the genito-urinary system at any time in his life.

As the patient is a plethoric, thick-set, worrying neurotic type of individual, the question might arise as to whether the hypertension was of nervous origin, the hypertensive type, the renal lesion having nothing to do with it. However, the blood pressure postoperatively has been invariably normal, and the man now has more worries than before, as he recently lost his job, and has a large family.

COLD HYPERSENSITIVITY

M. A. Mullinger, M.D. and A. Bogoch, M.D.

Vancouver, B.C.

Cold hypersensitivity is a rather uncommon but very interesting form of physical allergy. It was Blachez¹ in 1872 who first described a case of urticaria attributable to cold. Horton and Brown,^{2,3} in 1927 and 1929, reported 6 cases of hypersensitiveness to cold, and described a clinical test for this syndrome. In 1936, when the total number of cases reported was about 70, Horton and Brown⁴ reviewed a series of 22 cases, the total number observed at the Mayo Clinic during the preceding 10 years.

The symptoms and signs exhibited by these patients fell into two groups. Following exposure to cold wind, cold water, or cold applications, all of the patients exhibited abnormal local

urticarial manifestations, usually taking the form of wheals appearing on the face, neck, hands, and occasionally on the lower extremities. Half of them revealed systemic reactions which took the form of syncope, often occurring while swimming, or after swimming in cold water. The ages ranged from 15 to 59 years, and there was no special sex incidence. Most of the patients were otherwise in good general health. The history of the case described below is very typical of the histories recorded by the above authors, and others who have observed cases.

The patient, a 25-year old, white, single female, stated that on a very warm summer day in 1940, after about 20 minutes of swimming in rather cold lake water, she became dyspnoic, anxious, weak, and found it very difficult to reach shore. When she did, she felt light-headed, nauseated, and had to lie down on the sand where she shivered for about 30 minutes. During the winter of 1941 in southern Ontario, her tolerance to cold weather decreased. On exposure, her face became blotchy red and very warm, and this was accompanied by sensations of burning and tingling. In 1942, while swimming in Lake Ontario, she was just able to reach shore when she fainted. During the next 2 years, two other fainting episodes followed swimming, which forced her to give up that pastime.

The history showed that after a few minutes of walking on a cold day, her exposed skin becomes red, itchy, warm, and tense to touch. Small white urticarial wheals appear diffusely scattered over the face and neck. The ungloved hands swell so from generalized oedema, that it becomes difficult to flex the fingers. Congestion of the nasal mucosa may occur, so that mouth breathing is necessary, and occasionally an inspiratory wheeze follows. Deep seated headaches of a few minutes duration, more often right fronto-temporal than generalized, may appear during the very cold days. If her forearm rests on a very cold railing, a raised urticarial line appears, and then disappears in a few minutes.

In other respects, the patient has been and is in excellent health. Routine general examination, blood counts, sedimentation rate, and x-ray of the chest reveal no abnormalities. There is no family history of allergy.

The clinical test for this syndrome consists of placing a hand in water at 10° C. for 6 minutes. Water at this temperature is very uncomfortable to any hand, but immediately on removal, the patient complained of burning and tingling, and her hand became very red, tense and warm to touch. At the end of the first minute, a red line of demarcation was noted between the exposed and non-exposed parts, and at 2½ minutes it took the form of a white, raised urticarial line. Three minutes after withdrawal, swelling was quite evident especially on the dorsum, and the hand was very warm. Swelling gradually increased during the next few minutes, and at the end of 11 minutes it was so severe that flexion of the fingers was markedly limited. Pitting oedema was easy to demonstrate. Swelling gradually subsided, until none was evident at the end of 32 hours.

Using water at higher temperatures, the same experiment was repeated, and it was found that 25° C. was the highest at which an abnormal local response could be obtained. At this temperature the response consisted of marked redness and increased warmth, which persisted for 35 minutes. At 20° C. pitting oedema could be demonstrated.

In half of the cases reported by Horton and Brown,⁴ systemic reactions came on from 4 to 6 minutes after the exposed extremity was

removed from the cold water. The systemic response took the form of a rise in pulse rate, a fall in blood pressure, and flushing of the face. The blood pressure and pulse rate did not change appreciably in the patient observed, but 3 minutes after withdrawal of the hand, a moderately severe, right fronto-temporal headache similar to those she experiences on very cold days, appeared and lasted for 10 minutes.

Considering the history of syncope, it was thought that a systemic response might be obtained with a larger exposed area, and so both lower limbs were immersed to within 3 inches of the tibial tubercles. The local response resembled the fairly severe oedema found in congestive heart failure, except for the sharp, white, raised line of demarcation between the exposed and non-exposed parts. Rather interesting was the effect of gravity on the severity of the oedema. The leg that was supported in a horizontal position was much less swollen than the one that was held in a vertical position. The systemic response was more noticeable than in the hand

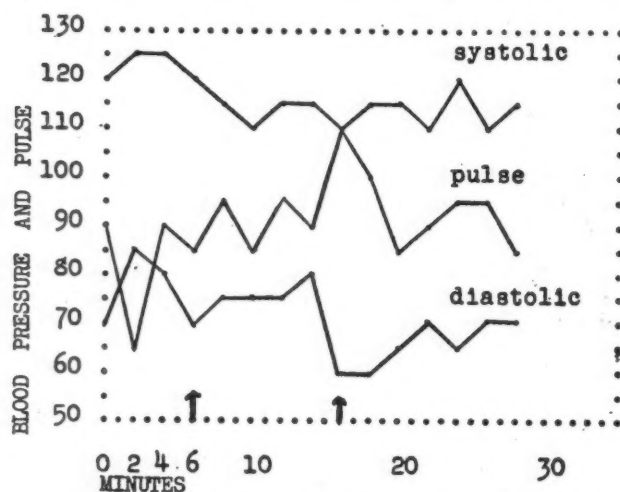


Fig. 1.—The sphygmomanometer was inflated to halfway between the systolic and diastolic blood pressures before the hand was immersed in water at 10° C. for 6 minutes, and was kept inflated for an additional 10 minutes after the hand was withdrawn.

test. Six minutes after removal of the legs from the water at 10° C., the blood pressure and pulse rate showed changes similar to those observed in the tourniquet test, which is described below. The headache was of the same type and severity as before, and 7 minutes after withdrawal the face and neck became very flushed. The total gastric acidity increased, and free acid appeared in an otherwise achlorhydric patient.

The tourniquet test consists of placing a sphygmomanometer just above the area of exposure, and maintaining it midway between the systolic and diastolic pressures. The hand is immersed in water at 10° C. for 6 minutes, then withdrawn, and the tourniquet is left in place for 10 minutes longer. While it is in place, no local or systemic reaction occurs. When the tourniquet is released, the systemic response is reported⁴ to occur within 2 minutes, whereas without the tourniquet, the reaction occurs in from 4 to 6 minutes after removal of the hand from the cold water. The systemic response is much more severe and frequently lasts three times as long as when the tourniquet is not used. In the patient observed, a few seconds after the tourniquet was released, the face and neck became intensely flushed and the patient complained of a severe headache. The changes in blood pressure and pulse rate may be noted in Fig. 1.

In 1932, Horton and Brown⁵ reported that in several patients with hypersensitiveness to cold, a rise and fall in gastric acidity followed the immersion of one hand in water at 10° C., and that this reaction was identical with that noted after parenteral administration of histamine. In the patient observed, 14 minutes after withdrawal of the hand, the total acidity was found to be almost double the value at the beginning of the test.

According to Lewis,⁶ and Horton and Brown,⁴ the etiology of this condition is linked with histamine or a histamine-like substance. It is thought that cold acts on the tissue cells to release histamine, which in addition to producing the local changes, attains sufficient concentration in the general circulation to produce reactions comparable to those obtained when histamine is injected into the body. In most of the cases reported, the authors conclude that the systemic response can be reproduced quite accurately by the administration of histamine subcutaneously, the dose varying from 0.38 to 0.50 mgm. Intra-arterial injection of from 0.1 to 0.15 mgm. of histamine, is reported⁴ to cause local swelling of the hand distal to the point of injection. The similarity of the effect of cold and that of histamine on the gastric acidity, further implicates histamine as the causative agent. The failure of a systemic response to occur while the tourniquet is left in place, also adds evidence in favour of a chemical rather than a nervous basis for this constitutional response.

In the case now being described a frontal headache was the first effect of a subcutaneous injection of 0.4 mgm. of histamine, given 2 inches above the wrist on the flexor surface of the forearm. It appeared 2 minutes after injection, and then half a minute later the face and neck became intensely flushed and warm to touch. At the end of 3 minutes a white wheal, 1 inch in diameter, with extending pseudopodia, was evident. Mottled redness appeared about the wheal and extended in a triangular fashion with the apex at the elbow. At the end of 11 minutes, the mottled redness coalesced around the wheal for 1½ inches in diameter. The wheal disappeared in 1½ hours, while the headache lasted only 20 minutes. No appreciable change was noted in the pulse rate or the blood pressure, and flushing of the face and neck was only slightly more pronounced than that ob-

served in the tourniquet test. The marked rise in gastric acidity as compared with the highest rise caused by any of the cold water tests, may be noted in Fig. 2. It is interesting to observe the similarity of the headaches experienced by the patient on very cold days, and those described in the histamine and cold water tests.

TREATMENT

Adding further evidence to implicate histamine as the etiological factor, four types of treatment have been reported as giving very good results. Systemic desensitization to cold can be accomplished by having the patient immerse the hands in water at 10° C. for from

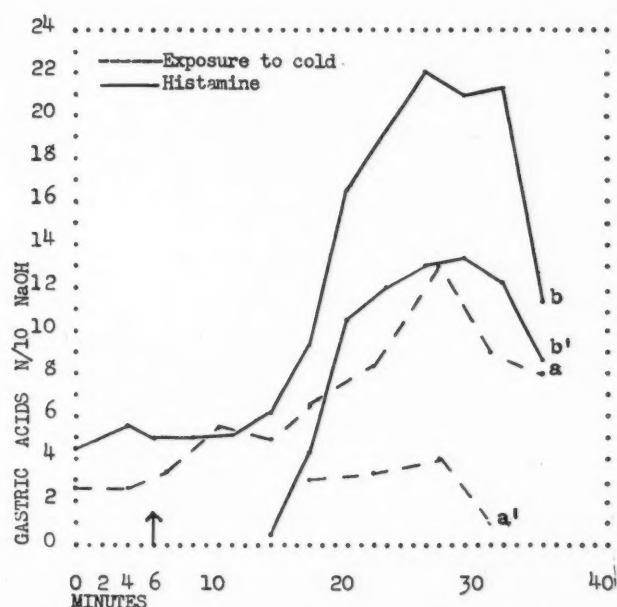


Fig. 2.—A comparison of the increase in gastric acidity following the immersion of both legs in water at 10° C. for a period of 6 minutes, and that obtained following the subcutaneous injection of 0.4 mgm. of histamine. Curves a and b represent the total acid; curves a' and b' represent the free hydrochloric acid.

1 to 2 minutes twice daily, for a period of 3 to 4 weeks. It is said to have afforded complete relief to 16, and to have improved 5 of the 21 cases treated in this manner by Horton and Brown.⁴ Both Bray,⁷ and Horton and Brown,⁴ have reported good results by passive desensitization using repeated subcutaneous injections of 0.1 mgm. or less of histamine twice daily, for from 2 to 4 weeks. Histaminase was tried by Roth and Horton,⁸ and was found to be effective in all 10 cases treated. Torantil, one of the earlier antihistamine preparations, has been reported by the same authors⁹ as having been used successfully in 1 patient. In a recent case

report by Notier and Roth,⁹ at the Mayo Clinic, 50 mgm. of benadryl was given 4 times a day for 18 days, after which time the hand test revealed a 50% improvement. The patient then took 50 mgm. twice a day for the next 30 days. Two weeks after the drug was discontinued, the hand test showed less than a 50% improvement.

Our patient was placed on 100 mgm. of benadryl twice daily for 24 days. Side actions included drowsiness, nervousness, tremulousness, dry mouth, polydipsia, polyuria, and gnawing sensations in the epigastrium which were sometimes relieved by sodium bicarbonate. While on therapy, questionable or very little symptomatic improvement was noted following exposure to cold weather. The hand test performed 8 hours after the last dose was taken, revealed about 50% improvement as judged by the amount of swelling and the length of time that it persisted. The test was repeated 33 hours after the last dose, and no improvement was noted. In view of the side effects, and the lack of symptomatic improvement, it was felt that benadryl was not satisfactory in her case. Pyribenzamine, 50 mgm. four times a day, was given for a period of 5 days. Results were similar to those observed with benadryl, except for the absence of side effects.

Desensitization by subcutaneous injection of histamine, and by immersion of the hands in cold water as described above, were both attempted with no beneficial results.

SUMMARY

The subject of cold hypersensitivity is briefly discussed, and methods of investigation and treatment noted. Previous reports have dealt with the uniformly good results following anti-histamine therapy. A case in which anti-histamine therapy was of little value is described.

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DUPUYTREN'S CONTRACTURE ASSOCIATED WITH CORONARY ARTERY DISEASE*

Mercier Fauteux, M.D., F.R.C.S.[C.] and
Chas. B. Ripstein, M.D., F.R.C.S.[C.]

Montreal, Que.

The etiology of Dupuytren's contracture of the palmar fascia has always been obscure. The Baron himself stated in 1832 in his original description of the condition, that he could find no satisfactory theory. "It is for us to search and to find the cause." Trauma was long considered to be an important etiological factor, but many cases have been reported in sedentary workers in whom the effect of trauma cannot be blamed. An hereditary tendency has also been noted in some cases but this is by no means a universal finding. A chronic low-grade inflammation has also been considered, but the pathological picture of the palmar fascia in Dupuytren's contracture is one of pure hypertrophy with no evidence of inflammatory or neoplastic lesions.

Nippert originally brought forward the theory that Dupuytren's contracture was due to a hyper-irritability of the sympathetic nervous system. This was further developed by Powers who pointed out the frequent association of the palmar fascial lesion with other evidences of sympathetic dystrophy such as Raynaud's disease, scleroderma and hypertrophic pulmonary osteoarthropathy. He believed that the close anatomic association of the ulnar nerve with the thoracic sympathetic ganglia explained the predilection of the contracture for the ulnar side of the hand. He also pointed out that many cases of Dupuytren's are associated with intrathoracic disease. In the conclusions to his paper, he states: "Dupuytren's contracture is not an isolated condition and not a clinical entity, but usually an effect of past or present visceral disease producing irritation of the sympathetic system".

The association of Dupuytren's contracture with coronary artery disease was first noted by Askey in 1941. In a review of the syndrome of painful hand and shoulder following myocardial infarction, he reported seven cases which showed changes in the palmar fascia

resembling those found in Dupuytren's contracture. Kehl added another six cases in 1943 and noted that associated abnormalities such as paræsthesia and colour changes were also present in five of these. In all of Kehl's cases the palmar fascia lesions developed following coronary occlusion and in none were any changes noted prior to the episode. The time interval varied from 3 to 11 months. He believed that although the pathogenesis of the condition could not be definitely established, irritation of the sympathetic ganglia played an important rôle.

Many have denied that there is any direct relationship between Dupuytren's contracture and coronary artery or other intrathoracic disease and consider the association to be purely coincidental in conditions which reach their peak incidence in a similar age group. Thus Ayre was unable to demonstrate any associated diseases in a group of 64 cases of Dupuytren's contracture, and others have reported a similar experience.

The following cases are recorded as Dupuytren's contracture following coronary artery occlusion. While a direct relationship cannot be established at present, it is felt that only by careful observation of such cases can this problem ultimately be solved.

CASE 1

The patient, a 55-year old male of Italian descent was admitted to the Royal Victoria Hospital, November 28, 1947. He had been perfectly well until October, 1945, when he had an episode of acute coronary occlusion for which he was hospitalized for 6 weeks. Electrocardiographic tracing at that time showed evidence of a posterior infarction. He made a good recovery and was well until March, 1946, when he had a second similar attack and again was hospitalized and treated by bed rest for 6 weeks. Since that time he has suffered from a feeling of pressure in the chest on exertion and has noticed a gradual decrease in his exercise tolerance. Four months after the second episode of coronary occlusion he first noticed thickening in the palms of both hands, particularly involving the ring fingers. This appeared simultaneously in both hands and has not been progressive. He is certain that it was not present prior to his coronary occlusion in March, 1946.

There is no familial history of Dupuytren's contracture and no history of trauma.

CASE 2

This patient, aged 74, had his first episode of coronary occlusion at the age of 67. Since the first attack he had three or four episodes of severe anginal pain culminating in a second myocardial infarction at the age of 74. About two years following his initial coronary occlusion he noticed thickening of the palmar fascia in the right hand at the base of the 4th digit. This progressed for a short time and then became stationary and did not change during the next two years. At the time of examination in 1946 he had a typical early Dupuytren's contracture of the right hand involving the 4th finger.

There is no history of occupational trauma and no family history of Dupuytren's contracture.

* From the Department of Surgery, Royal Victoria Hospital, Montreal, Que.

SUMMARY

1. Two cases of Dupuytren's contracture of the palmar fascia following coronary occlusion are presented.

2. The etiological relationship between the two conditions is not established but the possibility of the contracture being due to irritation of the sympathetic nervous system must be considered.

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CLINICAL and LABORATORY NOTES

A NOTE ON PYRIBENZAMINE IN ANGINA PECTORIS

John McEachern, M.D.

Winnipeg, Man.

Early in January, 1948, a physician aged 51, who had had very definite angina pectoris for three years, developed a contact dermatitis. Prior to this, this patient could not walk a block without substernal distress. This was particularly true on exertion after breakfast, or on walking against cold winds, of which there are many in these parts. His blood pressure was usually 160/100 and occasional electrocardiograms showed moderate evidence of hypertensive heart disease.

The patient was well adjusted to his disability and took no medicine except a prophylactic dose of nitroglycerine gr. 1/200 on very cold days. With care he carried on a fairly large consulting practice at hospital and office.

To get back to the dermatitis. While trying to discover the contact factors, the irritation and itching of the lesions was severe and pyribenzamine* was prescribed. A dose of 50 mgm. was taken during breakfast and lunch and at bedtime. This relieved the irritation for from four to six hours. Drowsiness wore off after four to five days. There was some dryness of the mouth. It was some days, however, before the patient realized that he was no longer experiencing any anginal pain.

Following improvement in the dermatitis, the pyribenzamine was continued, 50 mgm. at breakfast and 25 mgm. at lunch. With one exception there has been no pain since. This followed exposure to cold and exertion at the funeral of a good friend. The coronary claudi-

* The pyribenzamine used was manufactured by the Ciba Company.

cation time of this patient has been doubled. Not only can he walk farther but he can walk twice as fast as when on his enforced restricted regimen.

Since January, some eight cases of angina pectoris have been given this drug. No claims were made for its efficacy, but the intelligent patients were asked to study their exercise tolerance. Seven of the eight have reported very definite improvement.

It is difficult to assess the subjective symptoms in these few cases, but I feel justified in bringing this treatment to the attention of the medical profession, so that its value may be proved or disproved.

Further careful studies on a series of cases are being undertaken—but in the meantime I present this clinical impression of a drug which I believe will eventually prove of real value.

Dated, March 22, 1948.

PROCTOLOGY

F. B. Bowman, M.B., F.R.C.P.[C.]

Hamilton, Ont.

Diseases affecting the anorectal region have been a very lucrative source of income for proprietary medical concerns, drug stores and even corner groceries. This has been due to the many varieties of pills, ointments and suppositories sold to the public as cures for piles. Although proctology, as a specialty, has attained a position equal to if not more necessary than some others, the public still continues to be misled by the advertising claims of nostrums sold over the counter. Embarrassment or perhaps more often modesty is in great part responsible for this mental attitude but some blame may be placed on the doctor who is often careless or negligent in his attitude toward the patient who complains of some anorectal disorder, or has self-diagnosed his case as "piles". Symptoms such as itching, protrusion or pain, qualify themselves in the mind of the patient, and in many instances suffice for the diagnosis of hæmorrhoids by the doctor and perhaps the gift of some sample suppositories or a curative ointment. The doctor who thus dismisses a patient without even a digital examination, has assumed a great responsibility, for he may have condemned him to a life of invalidism for an operable malignancy or pre-malignant lesion may have been missed. In a monograph published a few years ago I stated that every person over forty years of age had some form of anorectal trouble, and since then I have had no reason to deny or even moderate that statement. In industry, absenteeism, because of some rectal condition, is frequent enough to be considered a serious problem.

In teaching institutions not enough emphasis is placed on methods of diagnosis and treatment

in anorectal disease. Proctoscopy and sigmoidoscopy are treated casually as though the whole procedure consisted in the introduction of the instrument, little attention being given to pathological conditions found in the rectum and lower colon. Endoscopy of the rectum and colon requires as much attention to detail as cystoscopy, bronchoscopy and other diagnostic methods. Reports of perforation of the sigmoid colon have been made following careless or indelicate instrumentation, through ignorance, with subsequent abdominal section and repair. Even proctoscopy should be performed with great care to avoid pain and perhaps injury to the mucous membrane of the anal canal and rectum.

In 1899 the American Proctologic Society was organized by a group of skilled men interested in ethical proctology, in the hope that the treatment of anorectal disease could be taken out of the hands of unethical practitioners. Up until this time, scattered throughout the United States, were many "pile injectors", who were in the same class as travelling spectacle fitters. The American Proctologic Society now consists of over 400 members highly trained in this specialty, and the unethical charlatans have practically disappeared.

The derivation of the word proctology, *proctos* meaning anus, and *logos* meaning discourse, is rather ambiguous. The field of the proctologist now includes the colon as well as the rectum, and both medical and surgical treatment. Although the colon presents problems requiring great skill, the pioneer work of Miles and many others since has reduced the mortality rate until there is no more risk attached to major operations on the large bowel, than any other abdominal section. The surgical glamour of these major operations has dimmed perhaps the value of what many are pleased to call minor proctologic problems, and these sometimes are treated carelessly and inadequately. Anal pruritus, chronic anal ulcer, papillitis, fistula, hæmorrhoids, to mention a few, are in many instances treated unskillfully by otherwise expert surgeons. The proctologist, surely, has an important part to play in the treatment of these patients, as important as the gastroenterologist, urologist, allergist, and other specialists have in their special fields.

Agonizing instrumentation by unskilful operators antagonizes the patient toward any suggested rectal treatment, examinations which should be practically painless. The external sphincter is still being brutally ruptured under deep anæsthesia for the cure of fissure. The distressing and mentally depressing symptoms of pruritus ani are being treated perfunctorily, without serious study. Small precancerous adenomatous lesions of the rectal and sigmoid mucosa are missed for want of careful proctoscopic examination. Patients are still complaining of the unpleasant symptoms following hæmorrhoidectomy and other rectal operations.

The modern proctologist can promise little or no discomfort.

Proctology has a place to fill in the specialist field, and in the large centres is filling it. Although looked on by many as distasteful, it has become one of the most interesting specialties in medical practice. Any person who can be relieved from the agonizing symptoms of anorectal disease, skilfully and delicately, will never recommend his friends to visit the drug store for a cure.

A-B-O AND Rh BLOOD ANTIGEN OF FETUSES OF ABOUT 45 AND 55 DAYS

Bruce Chown and Marion Lewis*

Children's Hospital, Winnipeg, Man.

The following is placed on record because of the paucity of reports¹ as to the time at which the Rh antigens may be demonstrated in fetal blood. The present fetus, kindly obtained for us by Dr. Ross Mitchell, was, by menstrual dates, 55 days old; had a crown-rump length of 30 mm., agreeing with an age of 56 days.² The father is group A, Rh phenotype R₁r, most likely genotype R₁r, $\frac{CDe}{cde}$. The mother is group B, Rh genotype R'r, $\frac{Cde}{cde}$. The fetus was group AB, Rh genotype R'r, $\frac{Cde}{cde}$.

ADDENDUM

Since this note was written, blood from a probably younger embryo has been examined through the kindness of Dr. Walter Tisdale.

The first day of the last menstrual period of the mother of the embryo was December 26, 1947. Conception took place about January 10, 1948. Therapeutic abortion was done on February 24, 1948, so that the embryo was probably about 45 days old. Unfortunately it was not seen at the time of abortion, so that its size is not known, but the placenta measured 5 cm. in diameter, and weighed 18 gm. Only one small drop of blood was obtained from the placental vessels. The blood factors of the family were determined as follows:

Husband	AB, Rh phenotype, R ₁ R ₂ (CDe.cDE),
Wife	A, Rh genotype, rr (cde.cde),
First child	AB, Rh genotype, R ₂ r (cDE.cde),
Embryo	A ₁ B, MN, Rh phenotype, R ₀ ; i.e., reacting to the two anti-sera D (Rh ₀) and c (Rh').

The Rh genotype of this embryo is almost certainly either R₁r (CDe.cde) or R₂r (cDE.cde), but there was insufficient blood to retest with anti-C (Rh') and anti-E (Rh''). In any case the data proved that the antigens A₁, B, M, N, D, and c were demonstrable in an embryo of about 45 days.

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1. POTTER, E. L.: Rh, Year Book Publishers, 1947.
2. FRAZER, J. E.: Manual of Embryology, Baillière, Tindall and Cox, 1931.

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THE CANADIAN MEDICAL ASSOCIATION

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EDITORIAL

THE SCIENTIFIC APPROACH

TWO recently published books provide some curious comparisons. One is *Sexual Behaviour in the Human Male*,¹ by Alfred C. Kinsey, *et al.*, and the other is *140 Million Patients*,² by Carl Malmberg. Both are by men of wide experience in dealing with large quantities of material about people, and in both cases the material has debatable sociological aspects. There are no other similarities. There is, however, a striking contrast in the approach to their subjects by the respective authors. Dr. Kinsey's constant and avowed preoccupation is to look at his findings dispassionately; he is steadily determined to keep his mind free of bias, and in this he may be said to have succeeded. Incidentally he does not attempt to popularize his subject, and yet, even though his publisher was safe in thinking that it would be "one of the most provocative books of our times", even he did not foresee that it would become that most unpredictable phenomenon, a best seller. Mr. Malmberg's journalistic method at once defeats any idea he may have ever had of being detached; for journalism with all its virtues is seldom without colour, which means bias. No doubt he is faced with problems which respond well to dramatic treatment. The provision of medical care, which is the same thing as the practice of medicine, can never be perfect, and he who would show up the discrepancies between its ideals and its accomplishments will easily find glaring faults. But whilst the dispassionate man (or the dramatist) would record these he still would not suppress the brighter side represented by the work of many honest and self-sacrificing men. Of this suppression Mr. Malmberg, for his own purposes has been guilty. In other words, he is a propagandist.

It is a question whether the political factors bound up with socialized medicine will ever be

treated with the detachment of the scientist. There is a science of sociology, and perhaps also of political economy. But is there a science of politics? So far as Mr. Malmberg was an investigator for the U.S. Senate Subcommittee on Health and Education he could be credited with a scientific approach. But with his presentation of the results of his investigation all hope of his qualifying as a dependable observer vanish. Not in the cockpit of the senatorial committee room, with statement and counter-statement of generalizations and exaggerations do we find the comfort of confidence. Perhaps no one has yet presented the case for socialized medicine dispassionately. It may be very difficult to do so. But the attempt would be worth while.

EDITORIAL COMMENTS

Gifts of Food for Britain

We would like to draw attention to the appeal which is being made by the Federation of Medical Women of Canada (page 514) for the sending of food parcels to families of our colleagues in Great Britain.

Nothing adds so much to the pleasure of giving as the establishment of even a slight personal contact. The Federation deserves high praise for its work in organizing these gifts in such a way that we can feel a direct link with those whom we would like to help. Contributions, either of orders for parcels or of money may be made now or (and/or!) at the Annual Meeting.

International Orthopaedic Surgery

The publication of the first British Commonwealth number of the *Journal of Bone and Joint Surgery** marks an important step in international co-operation among orthopaedic surgeons. It is a lead which might well be followed not only by other branches of medicine but by other professions as well, to advance clinical and scientific investigation and promote international good will and understanding. The Journal, formerly published in four volumes in America, has been expanded to eight volumes edited and published alternately in London and Boston. The new Journal is directed by an Editorial Board of 32 members, 16 representing the American Orthopaedic Association and Academy of Orthopaedic Surgeons; and 16 representing the British, Canadian and Australian Orthopaedic Associations; the Ortho-

1. *Sexual Behaviour in the Human Male*, A. C. Kinsey, W. B. Pomeroy, and C. E. Martin: W. B. Saunders Co.; McAinsh & Co., Toronto, 1948.
2. *140 Million Patients*, Carl Malmberg: Reynal & Hitchcock, New York City, 1947.

* *Journal Bone and Joint Surgery*, British Number, 30 B: 9-58, 1948.

pædic Surgeons Group of the Union of South Africa and the Orthopædic Surgeons of other Dominions and colonies of the Empire. Sir Reginald Watson-Jones is the British Editor and Dr. W. Rogers the American Editor. The articles on recurrent dislocation of the shoulder appearing in the February issue are an example of the merit of international co-operation. Many controversial points in this condition are cleared up and a detailed follow-up of 641 cases is presented.

H. M. COLEMAN

MEDICAL ECONOMICS

THE SWIFT CURRENT EXPERIMENT

A. D. Kelly, M.B.

Toronto, Ont.

To the student of health insurance, no more interesting experiment exists in Canada today than that which is proceeding in Saskatchewan's Health Region No. 1. The area covered consists of 87 municipalities and local improvement districts in the south-west corner of the province, with a total population of 54,000 persons. The region is predominantly rural, but the city of Swift Current, the towns of Maple Creek and Shaunavon, with populations of 6,200, 1,200 and 1,600 respectively, are included. The principal industry of the region is agriculture, and the economy is subject to wide fluctuations of prosperity and depression. In the "dusty 30's" this area was extremely hard hit, and a relatively large proportion of the people required public assistance.

Several municipalities in the area have had experience in the provision of medical services by municipal-doctor contracts and by local mutual medical and hospital benefit associations. Under authority of the Saskatchewan Health Services Act 1946, the area under discussion was designated Health Region No. 1, primarily for the purpose of providing a public health program in preventive medicine. This legislation provides for the establishment of a Regional Board which acts as a Board of Health for the purposes of the Public Health Act. The Health Services Act, however, provides in addition that, subject to the approval of the minister, a regional board may make arrangements for the provision of medical, hospital, dental, nursing and other health services. It was decided to proceed with this more extensive plan and on July 1, 1946, there was inaugurated in Health Region No. 1 an arrangement to provide all residents of the area with a complete medical and hospital service. Subsequently, the hospital benefit was superseded by the Saskatchewan Hospital Services Plan

which provides for compulsory hospital care insurance applicable to all citizens of the province.

At present, 18 months after its commencement, there is provided for the residents of Health Region No. 1 a complete medical service on a more extensive scale than exists for a total population elsewhere in Canada, and the patterns being established may well serve as a guide for future developments. The question may well be asked, is this compulsory health insurance? The plan was set up under the authority of provincial legislation, assented to by a majority of the voters affected, and financed by taxation which is levied on all citizens of the area. In the opinion of the writer, the plan fulfils all the criteria of a plan of compulsory, contributory health insurance, and the question may be answered in the affirmative.

In examining the details of the medical services of Health Region No. 1, Saskatchewan, it is proposed to utilize as a basis for comparison the Principles Relating to Health Insurance enunciated by the Canadian Medical Association in 1944. These Principles represent the policy of the Canadian Medical Association. To facilitate their use as a yardstick against which to measure this example of health insurance, they have been rearranged from their usual order and are quoted in full in the relevant sections of this report.

SCOPE

All residents of Health Region No. 1 and their dependents, with the exceptions noted hereafter, are eligible for medical service. The present number of insured persons is approximately 49,000. Newcomers to the area for permanent residence are eligible for service in 3 months. The recipients of pensions in the area, such as Old Age Pensions, Blind Pensions and Mothers' Allowance, have medical care separately provided by the provincial government. War pensioners are provided with medical care for their pensionable disability by Federal authority, but in all other respects they are subscribers to the plan of health insurance. Indigents are fully covered, as their contributions are paid for by their municipality. The group of persons just above this income level who are ineligible for municipal assistance are said to represent a problem as they find it difficult to pay the personal tax. This is the group known to the medical profession as medically indigent in that they appear to be able to finance most expenses other than medical. Health insurance should provide the answer to their problem and it is disconcerting to learn that this is not the case.

Residents requiring medical care while temporarily absent from the region are reimbursed for expenditures made up to the amount that the

services would have cost had they been rendered within the Region. Provision is made for contributions to be received from transient workers who come into the region to engage in harvesting, threshing and mining, and they are made immediately eligible for full benefits. One section of the region which is without hospital facilities is not served by a resident practitioner. Consideration is being given to the payment of a subsidy to attract a doctor to the area.

The Principles relating to scope of service are as follows:

Principle 5.—While leaving to each Province the decision as to persons to be included, the plan must be compulsory for persons having an annual income insufficient to meet the costs of adequate medical care.

Principle 6.—The dependents of insured persons should be included in the health benefits.

Principle 7.—Medical care for resident and transient indigents should be provided under the plan, the Government to pay the premiums.

It would appear that, in scope, the application of health insurance in this instance is consonant with the Principles.

BENEFITS

Complete medical and surgical care, with the exceptions noted hereafter, is afforded the residents of Health Region No. 1, and where it is not available from the doctors practising within the region, provision is made for the referral of patients to specialists practising outside the area.

Exceptions to the general provision of complete medical care are as follows:

(a) Treatments of a purely cosmetic nature are not authorized.

(b) The region assumes no liability for the payment of the cost of lenses, glasses or spectacles.

(c) As Provincial facilities are otherwise available, the region does not undertake to provide for the treatment of cancer, tuberculosis, epilepsy or mental disease in institutions. Alcoholism and drug addiction are not treated under the plan. Medical accounts for patients eligible under the Workmen's Compensation Act or the plan for the care of Old Age Pensioners, blind pensioners and recipients of Mothers' Allowance are not a charge against the funds of the region.

(d) Mileage is not paid for except in the case of doctors resident within the region who are called in by a colleague in the capacity of consultant or assistant.

(e) The services of nurses in the home are not available except under extraordinary circumstances.

(f) The procurement of drugs and pharmaceuticals are a responsibility of the patient.

(g) Hospitalization is provided separately under the Saskatchewan Hospital Services Plan.

The benefits provided may be more specifically stated as follows:

(a) The services of general practitioners. There are at present 34 doctors practising in the region and all participate in the plan by rendering medical services.

(b) The services of specialists. Two of the doctors resident in the region are certificated in general surgery by the Royal College of Surgeons of Canada, although neither confines his work entirely to this field. A specialist in radiology, who is stationed at the Swift Current General Hospital, is employed on salary by the Regional Board. His services are available to all doctors and hospitals in the region. The services of specialists in other fields are ordinarily obtained by the referral of patients to centres outside the region.

(c) Diagnostic and Out-patient service. Radiological and clinical laboratory facilities are available at several hospitals within the region. Diagnostic problems requiring services and facilities of greater extent are handled by referral to appropriate centres outside the region. The hospitals are reimbursed for the use of their facilities in radiology, minor surgical procedures, laboratory diagnosis, physiotherapy, etc., when these are utilized by ambulatory patients not requiring admission or occupancy of a bed. All such outlay is classified under the heading of out-patient service.

(d) Dental services. A reasonably complete dental service is provided for residents of the region under the age of 16 years. The services of private practitioners of dentistry are utilized in addition to the work of three salaried dentists who operate travelling clinics within the area. Beginning January 1, 1948, the utilization of private dental practitioners has been curtailed and it is hoped that the services of the travelling clinics will suffice to render dental care to the youthful population.

(e) Preventive services. The region is served by a full time staff in Public Health, consisting of a medical officer of health, seven public health nurses who are certified inoculists, a health educator and three sanitary inspectors. A full program of preventive services is provided and medical practitioners are afforded the opportunity of participating both in organized clinics and in their private practices.

The Principles relating to benefits are as follows:

Principle 1.—The Canadian Medical Association approved the adoption of the principle of contributory Health Insurance, and favours a plan which will secure the development and provision of the highest standards of health services, preventive and curative, provided the plan be fair both to the insured and to all those rendering the services.

Principle 8.—Health benefits should be organized as follows:

(a) Every regularly qualified, duly licensed medical practitioner, in good standing in the province, should be eligible to practise under the plan.

(b) The benefits conferred should be such as to provide for the prevention of disease and for the application of all necessary and adequate diagnostic and curative procedures and treatment. Specialist and consultant medical services should be available.

(c) The following additional services should be available through the medical practitioner: (1) nursing service; (2) hospital care; (3) Auxiliary services, usually in hospital; (4) pharmaceutical service, subject to regulation.

(d) Dental service.

It will be noted that the benefits provided in Health Region No. 1 differ very little from those recommended. Hospital care is provided through another agency. Nursing service is limited to that provided in hospital. Pharmaceutical service, however, is excluded, and as this has been a troublesome and expensive feature of certain other plans the omission may not be unwise.

ANCILLARY MEASURES

At present, and for several years past, the people of Health Region No. 1 have enjoyed a degree of prosperity which provides a happy contrast to conditions which existed in the previous decade. This has permitted a satisfactory improvement in living standards which should be reflected in better health. Since the inauguration of the plan of health insurance there has been evident a great demand for the correction of remediable defects which has resulted in a high incidence of operations of election. This in part reflects the natural desire of an insured population to utilize freely the available services, and also suggests that many of these procedures had been postponed during the depression years. It is anticipated that stability in this connection will be reached at a level lower than that which exists at present, but it is not yet evident how long will be required to achieve a normal experience.

Cash disability benefits are not provided in Health Region No. 1 and the institution of this feature is not contemplated.

The Principles pertaining to this section are:

Principle 2.—Inasmuch as the health of the people depends to a great extent upon environmental conditions under which they live and work, upon security against fear and want, upon adequate nutrition, upon educational facilities, and upon the opportunities for exercise and leisure, the improvement and extension of measures to satisfy these needs should precede or accompany any future organization of medical service. Failure to provide these measures will seriously jeopardize the success of any Health Insurance plan.

Principle 9.—Cash benefits, if provided, should not be taken from the health insurance fund.

PARTICIPATION OF PHYSICIANS

All of the thirty-four doctors resident in the Region, or located so close to its boundaries that their practice covers the insured, participate in the provision of medical care to the

population by individual uniform agreement made with the Regional Board. This arrangement is made only with fully qualified medical practitioners who are registered in the College of Physicians and Surgeons of Saskatchewan. In this agreement, the doctor undertakes:

“To provide medical and surgical attendance to any resident of Health Region No. 1 in possession of an identification card of Health Region No. 1, signed by the Secretary of the municipality within which such resident resides, to the extent that such medical services can be reasonably expected and safely rendered within the limits of the Region, at the doctor's office, or at the hospital or hospitals at which such doctor usually attends in the practise of his profession, or at the patient's home, when, on account of the nature of the illness or injury such patient cannot attend at the doctor's office.”

The arrangement differs in only one respect from the procedure of private practice in that the doctor's account for services rendered is submitted for payment to the secretary-treasurer of the Health Region rather than to the patient. In every other particular the pattern of private practice is preserved, both doctor and patient enjoying freedom of choice, and the referral of patients to specialists is provided for at the discretion of the practitioner.

Undergraduate teaching is not carried out in the Region, but the doctors are as free as other private practitioners to avail themselves of all opportunities for postgraduate instruction which present themselves. Research of a clinical or laboratory nature is not an activity of the plan, but the records which are being compiled will be most useful in respect of statistical investigations into the disability experience of a large insured population, as well as a mine of information for medical economists.

It is the hope of the Health Services Planning Commission that, when the complete medical course is taught at the University of Saskatchewan with its associated University Hospital, there will be a direct connection with regional programs of health services. This may be implemented through the association of regional radiologists and pathologists with their respective Departments at the University, through supervised internships at regional hospitals and through the development of postgraduate instruction centrally and by extension courses. The development of well-balanced group practice units at regional centres will be encouraged.

The Principles relating to this section are:

Principle 4.—It is not in the patient's interest that the State invade the professional aspects of the patient-doctor relationship. Subject to geographical and ethical restrictions this relationship includes free choice of doctor by patient and free choice of patient by doctor; it implies also maintenance of the confidential nature of medical practice.

Principle 13.—The granting of a license to practise medicine was designed primarily to protect the public. Therefore it is in the interests of the patient that all who desire licensure to practise a healing art should be required to conform to a uniformly high standard of preliminary education and of training in the recognized

basic sciences as well as to furnish proof of adequate preparation in the clinical and technical subjects.

Principle 15.—Every effort should be made to maintain health services at the highest possible level. This requires:

(a) Adequate facilities for clinical teaching in the medical colleges and hospitals.

(b) Postgraduate training of all medical practitioners at frequent intervals.

(c) Necessary facilities for, and support of, research.

ADMINISTRATION

The administration of this plan stems directly from the Statutes of Saskatchewan, the specific legislation being The Health Services Act, 1946. This Act empowers the Minister of Public Health to divide the Province into health regions designating them by name and number for the administration of the Public Health Act or of health services provided under the Health Services Act, or both. In the case of Health Region No. 1, both administrative functions have been assumed by the Regional Board, as a result of a poll of the electors resident within the area of the Region.

The relationship of the Provincial government to the administration of public health or preventive services is much more direct than it is to the administration of the curative medical services. The appointment of all members of the public health staff in a region is made by the Provincial Public Service Commission, and the Province assumes the major portion of the cost of the preventive services.

The Health Services Planning Commission is an important body named in the Health Services Act, which functions at the Provincial level. Its members are appointed by the Lieutenant-Governor-in-Council and its powers are broad. For example, the Act states that the commission shall: "Conduct investigations and make such recommendations as it deems advisable to the minister regarding the provision of health services and public health services to any residents of the Province", and "administer any Act or such part of any Act as may be assigned to it",

It would appear that the Health Services Planning Commission is potentially the most important single agency for the extension and administration of publicly financed health services in Saskatchewan. In the personnel of the Commission as currently constituted we find only representatives of the Department of Public Health, that is, medical men who are civil servants. Without disparaging the abilities of the present members of the Commission, it is unfortunate that a broader base has not been established by the appointment of members outside Government circles in order that this important body may be truly independent, representative and non-political.

The Act provides for the establishment of a Regional Board in which is vested complete local authority to supervise the health services

of the Region. This is a democratically elected body of 12 members in Health Region No. 1. Each participating municipality in the region elects one representative to a Zone Council and each Zone Council elects two or more members of the Regional Board. Special provision is made for the representation of the city of Swift Current by one member of the Regional Board, otherwise each 4,000 of the population is represented by one member.

It is striking to an outside observer that the Regional Board enjoys such a large measure of local autonomy. Having obtained the concurrence of the Health Services Planning Commission in the general scope of services and in its proposals for raising funds, it is left almost completely to the Regional Board to work out the details. It may be stated that funds for the curative health services are raised almost entirely within the Region and, on the theory of financing known as paying the piper, the marked degree of autonomy may be justified. This situation may also be tolerated since Health Region No. 1 represents the only region of the province which is organized to provide a complete medical care program. When further Regions are similarly organized the need of central administration and control will be more evident if any uniformity in policy, benefits and conditions is to be achieved.

The personnel of the Regional Board in Health Region No. 1 is made up entirely of laymen and no physician is in a position of administrative responsibility. The able administrator of the plan is Mr. Stewart Robertson, secretary-treasurer of the Region, who brings to this appointment considerable experience in the supervision of municipal medical service plans. A Medical Advisory Committee appointed by the District Medical Society advises the Regional Board on matters relating to medical services which may be referred to it. An Assessment Committee of doctors scrutinizes, adjusts and recommends for payment the accounts received from all participating physicians. The Medical Officer of Health occupies an office adjacent to the administrative headquarters of the Regional Board and although his duties do not extend to supervision of the curative health services, his presence is frequently helpful in the interpretation of the medical viewpoint on routine questions.

The Canadian Medical Association Principles relative to administration are as follows:

Principle 10.—Health Insurance should be administered by an independent non-political Commission representative of those giving and those receiving the services. Matters of professional detail should be administered by committees representative of the professional groups concerned.

Principle 11.—Under Health Insurance the Chief Executive Officer to the Commission and the Regional Executive Officers should be physicians appointed by the Commission from a list submitted by organized medicine in the Province.

Principle 12.—Each Province should be served by an adequate Department of Public Health, organized on the basis of the practising physician taking an active part in the prevention of disease.

It will be observed that the actual administrative practice of this plan deviates in several important respects from the recommendations of Principles 10 and 11. The most significant deviation relates to the composition of the provincial administrative body, the Health Services Planning Commission which has been previously noted. At the level of the Region itself administrative responsibility by physicians is absent and, while in the present circumstances, the arrangement has worked with remarkable satisfaction, this may in large part be due to the experience, ability and personality of the individuals concerned. It is our considered opinion that the provision of medical services can best be accomplished with the active participation of physicians in positions of administrative responsibility.

FINANCIAL

The financing of the health services provided in Health Region No. 1 is undertaken principally by taxation applied in the constituent municipalities, supplemented by a contribution from provincial funds. During the first six months' operation of the plan, July 1 to December 31, 1946, hospital care was included among the benefits, but since January 1, 1947, hospitalization has been provided for residents of Health Region No. 1 in common with all other citizens of the province through the Saskatchewan Hospital Services Plan.

The Plan was financed for the first six months as follows: (a) by a personal tax of \$5.50 per capita with a family maximum of \$30.00; (b) by a property tax of 1.5 mills on an assessment of \$67,000,000; (c) by a government grant for organization, public health, radiological and dental services. Actual receipts for the period were:

Personal tax	\$239,682
Property tax	99,848
Government grant	17,651
Sundry	116
Total	\$357,297

Expenditures during the six months of 1946 in which the plan was operative exceeded revenue by a considerable amount, giving a deficit of \$79,373. This deficit was attributable to two factors: (a) the total income was less than anticipated in view of the fact that the population proved fewer than originally estimated; and (b) the cost of hospitalization was underestimated by approximately \$75,000. This was due to greater utilization and higher costs of hospitalization than had been predicted.

For the calendar year 1947 the revenues to be raised in Health Region No. 1 were adjusted

as follows: (a) personal tax—\$10 for a single person, \$20 for a family of two, \$30 for a family of three or over; (b) property or land tax—2 mills on assessed value of property; (c) the provincial contribution in the form of grants mainly for preventive and diagnostic services covered the following items: (1) A flat grant of 25c per capita for general medical care and public health services. (2) Half the cost of radiological services. (3) Half the cost of dental services. (4) Half the cost of out-patient services. Under this heading the Region actually received from the Province in 1947, \$76,537, which is 11% of the total expenditure.

For the year 1947, the revenue and expenditures were as follows:

REVENUE	
Personal tax	\$376,012
Land tax	139,000
Grants	76,537
Sundry	1,390
	<u>\$592,939</u>
EXPENDITURE	
Medical services:	
(a) Within the region	\$401,453
(b) Referrals outside the region	58,547
	<u>\$460,000</u>
Out-patient services (x-ray, laboratory, physiotherapy, operating room, etc.)	50,000
Dental services:	
(a) Regional dental clinics	\$ 18,697
(b) Services of private dental practitioners	22,000
	<u>40,697</u>
Radiological services (regional)	11,177
Administration	23,570
Commission (to municipalities for collection)	15,000
	<u>\$600,444</u>

It will be noted that there was an operating deficit of \$7,505 in 1947.

The remuneration of the members of the medical profession who render service to eligible residents of the region is based on fee-for-service at a rate of 75% of the 1938 schedule of fees of the College of Physicians and Surgeons of Saskatchewan. This percentage was arrived at by negotiation before the commencement of the plan, and has been adhered to ever since in spite of the fact that a new contract schedule of fees has been elaborated in the province, which is designed for application without discount to other forms of contractual arrangements for medical services.

The Regional Board, recognizing that no reliable figures were available covering per capita cost of medical care under conditions as they exist in Health Region No. 1, decided to underwrite the total cost without imposing an arbitrary ceiling. It is the hope of the Board and the participating physicians that at the end of two years' operation, it may be possible

to forecast with relative accuracy the cost of medical services in a normal year of stabilized practice, and that a budget may be drawn up to provide the needed revenue.

The remuneration of the doctors reflects the volume of work done and during the calendar year 1947 the average gross income of the 34 participating physicians of the Region from this source was \$11,807. In assigning net figures it should be estimated that the expenses of practice amount to approximately 35% of gross income.

For the year 1948 it has been decided that revenue within the region shall be raised on the following basis: (a) personal tax—\$15 for a single individual, \$24 for a family of two, \$30 for a family of three, \$35 for a family of four or over; (b) land tax—2.2 mills on the assessed value of the property.

A typical family of four or more persons resident in Health Region No. 1 will, during 1948, make the following contributions for complete health services: (1) Personal taxes (a) for medical and surgical care, \$35 (family maximum); (b) for hospital care, to Saskatchewan Hospital Services Plan, \$20 (family maximum \$30). (2) Property tax, 2.2 mills on the assessed value of land.

The Principles relating to the financial aspects of a plan of Health Insurance are as follows:

Principle 16.—The principle of insured persons being required to contribute to the insurance fund is strongly endorsed.

Principle 17.—Any Health Insurance plan should be studied and approved actuarially before adoption and thereafter at periodic intervals.

Principle 14.—The method, or methods, of remuneration of the medical practitioners and the rate thereof, should be as agreed upon by the medical profession and the Commission of the province.

Principle 3.—It is not in the national interest that the State convert the whole medical profession into a salaried service.

It is evident that the financing of the plan is in essential harmony with all our principles. The personal tax provides for the contribution of all insured persons. In the absence of a firm basis of actuarial soundness the Regional Board has displayed a commendable willingness to provide the funds actually necessary to furnish the benefits and the financial structure has been adjusted on three occasions to meet varying circumstances. The fee-for-service method of remuneration which is favoured by the medical profession has been adopted for the payment of practising physicians. Only two doctors, the radiologist and the medical officer of health, are remunerated by salary.

CONCLUSIONS

An observer visiting the Swift Current headquarters of Health Region No. 1 gathers the impression that here is a successful experiment

in the large-scale provision of medical care, courageously applied, efficiently managed and remarkably free from attempts to make the facts fit preconceived ideas, financial or otherwise. The long-term view may well be taken that a recession in the economy of the Region may make it difficult or impossible to raise funds on the present scale, but this observation should not be regarded as a criticism of the current endeavour but rather as a statement of the conviction that plans of this type should be so broadly based as to minimize the effects of local variations in prosperity.

The insured population of the Region is enjoying medical service of a high quality and there is ample evidence that their demand for the services of doctors has increased since the inception of the plan. This is a factor of fundamental importance which should be reckoned with in any plans for the extension of medical services on a prepaid basis, as it is the expression of the human tendency to use freely services which do not require additional outlay at the time they are sought.

The participating physicians appear to be satisfied with the operation of the plan which differs so little from conditions of private practice. The medical population of the region has increased from 21 to 34 during the period July, 1946, to December, 1947, and the current physician-population ratio is of the order of 1:1,530. The high demand for medical care has had the effect of increasing the work of the individual physician and in general the impression is gathered that doctors are carrying the maximum load which is desirable in the interests of their health and efficiency.

While the provision of medical care remains local in its application, the administrative machinery which is now functioning is adequate though not ideal. The assumption by other Health Regions of similar responsibility for financing health services would demand the immediate reorganization of administrative bodies at provincial and regional levels. In this reorganization it is to be expected that the provincial authority would assume a greater measure of policy-making control with a consequent reduction in the authority and autonomy now exercised by the Regional Board.

New ground is being broken in Health Region No. 1. On all sides one hears the plan referred to as an experiment, and so it is. It is fitting that all concerned should observe its progress with scientific detachment and learn the lessons which will be disclosed with this application of the experimental method to medical economics.



MEDICO-LEGAL

THE LEGAL ASPECTS OF STERILIZATION

For the past five or six years the Canadian Medical Protective Association has become, and is becoming still more, increasingly concerned over the casual attitude adopted by doctors towards the sterilization of patients and over the consequent increase in the number of sterilizations being done. There seems to be lacking in some doctors a full realization of the implications, physical, mental and moral, of the operation. There seems to be a failure to draw these considerations to the attention of patients who must be sterilized or think they wish to be. Too few patients learn from their doctors the fact that the operative results, in the light of present knowledge, are permanent. So far as the Association can judge, sterilization is often done in a wholly casual, completely thoughtless fashion, as an incidental and often unnecessary part of some other surgical procedure, most often without permission; it is being done, as well, for healthy individuals who request it, usually for insufficient reasons of a temporary nature. There is not a month but what the Association has to inform some enquiring doctors that they may not accede to requests from healthy persons for sterilization, that such a procedure must be considered illegal till shown to be otherwise. If some doctors are enquiring before doing it there must be others who do it without enquiring. There can be little doubt that in the future some of these surgeons will find themselves in court trying to defend themselves against charges of assault and battery. That the Association's fears have not been baseless is shown by the fact that one member had to be defended in April, 1947, in a suit arising from alleged illegal sterilization and by the fact that another is at present faced with threat of suit for the same reason.

The case tried in April, 1947, illustrates the trouble that may arise when sterilization is done as part of another operation without adequate previous explanation to both the patient and the marital partner. A patient's family doctor referred a thirty-seven year old woman, who had had two children, to a surgeon because of an enlarging ovarian tumour. In the preliminary discussions with the family doctor the patient said to him "Could I be fixed so that I would not have any more children?" but no decision was reached between man and wife, there was no discussion between them about the matter, and the surgeon was not instructed before operation that sterilization was permissible. At operation, at which a dermoid cyst of the ovary was removed, the surgeon asked the family doctor, "Do they want sterilization by cutting off the other tube?", and the family doctor said that was his belief. With no more knowledge

of the patient's wishes than was conveyed by that conversation the surgeon did an Irving sterilization of the remaining tube.

Within three months of the operation the husband and wife were threatening suit on the grounds of unnecessary and unauthorized surgery, this in spite of the fact that the patient stated to the surgeon "quite freely that she had told (her doctor) that 'she did not want more children' but that she 'would never have consented to a sterilization operation'." Shortly thereafter through a lawyer a claim for damages was received, on the ground that the husband and wife "assert that the unauthorized sterilization of the wife constitutes a trespass by you upon her person, which is actionable . . . and they propose to commence proceedings against you in the Courts on the ground that you have committed an assault and battery against the wife for which you are liable in damages." That point should be noted particularly. The Association's General Counsel, Mr. J. D. Watt, K.C., drew attention to it later, "The plaintiffs in this case are suing for damages as a result of trespass, assault and battery upon the person of the female plaintiff by the defendants. It is not the same as an ordinary action for malpractice . . .".

The case came to trial in Hamilton, Ontario, before Mr. Justice Kelly and a jury. After two and a half days of evidence and argument the action was dismissed by the Judge on the findings of the jury. It had to be decided by the jury whether the patient's remarks to the doctor constituted consent, expressed or implied, for the operation and whether the husband, by his actions prior to the operation, had given his consent, implied or expressed, to his wife being sterilized. The jury found that both the husband and wife had consented to the operation.

That the Trial Judge may not have agreed wholly with the findings of the jury is suggested by his reasons for depriving the doctors of the costs of the action. These reasons are worth quoting because they draw attention to the wisdom, and indeed necessity, of having pre-operative permission for sterilization in any case where it may have to be done. Mr. Justice Kelly said:

"However, my main reason is the fact that (the doctor) admitted in his evidence that he was only consulted by the female plaintiff and that he acted upon her request (which was denied by the female plaintiff) and (the doctor) admitted that he did not discuss the operation nor the possible sterilization of the female plaintiff with her husband.

"As the relationship between a husband and wife is not only confidential, but is of the most intimate nature and is attended upon with such far-reaching consequences, I am of the opinion that anything that might be done which would interfere with such a sacred relationship and its consequences should be undertaken only with the consent of both parties and after discussion with the parties and advising them upon the consequences. Our laws recognize the mutual responsibility between husband and wife and we have

actions in our Courts claiming nullity of marriage based on sterility of one or other of the life partners. It, therefore, follows that any operation performed upon a wife which would interfere with that intimate relationship and its responsibilities and consequences should be authorized or consented to by both spouses.

"The jury in this action found that there was a tacit consent by the husband, but both defendants admitted in evidence that neither of them had received the husband's consent nor had even consulted him. I am of the opinion that they were not justified in cutting the second Fallopian tube, which was not necessary for her condition, with the consent only of the wife, hence my decision that the defendants should be deprived of their costs of the action."

(To be continued)

ASSOCIATION NOTES

Canadian Physicians' Fine Art and Camera Salon

Many more physicians plan to compete this year than ever before. This growing interest has spread to the lay press and may develop into competition for exclusive rights to a colour feature on the whole showing. A national magazine and a large Sunday pictorial have both enquired about covering the exhibit. There is yet time to plan an entry for the competition. Entry forms will be going out soon to all Canadian doctors. These forms contain all of the necessary information for submitting paintings, monochrome photography or kodachromes. This year's exhibitors may send in their works "express collect" or may deliver them in person to the Royal York Hotel in Toronto. The deadline for personal deliveries is 9 p.m., June 21.

The salon committee urges all physicians interested in art or photography to put their favorite subjects on canvas or film. An excellent jury of selection is looking forward to judging a large number of entries. The sponsor of the exhibition is Messrs. Frank W. Horner, Limited, of Montreal.

Trans-Canada Air Lines

Your attention is directed to the services of Trans-Canada Air Lines in making your travel plans to the Annual Meeting of our Association. Members, particularly those from distant points, will no doubt appreciate the convenient services of Trans-Canada Air Lines. May we suggest you contact your local Trans-Canada Air Lines Office and complete your plans early. If parties of twenty or more could be arranged a plane could be chartered on which all could make the trip together, and the time of leaving could be made to suit the party's convenience.

The Annual Meeting, 1948

Meetings of Affiliated Medical Societies

CANADIAN SOCIETY FOR THE STUDY OF ALLERGY

Tuesday, June 22, 1948, the Library, Royal York Hotel, Toronto.

- (1) 9.30 a.m.—*Thephorin and Neohetramin—An Experimental and Clinical Evaluation in Allergy States*, Dr. T. H. Aaron, Edmonton.
- (2) 10.00 a.m.—*Clinical Evaluation of the New Antihistaminics of Hydryllin* (Searle) and *Trimeton* (Schering), Dr. B. Manace, Toronto.
- (3) 10.30 a.m.—*Respiratory Allergy due to Mould*, Dr. C. H. A. Walton, Winnipeg.
- (4) 11.00 a.m.—*Some Unanswered Questions in Clinical Allergy*, Dr. Karl Figley, President, American Academy of Allergy, Guest Speaker
12.00 NOON, LUNCHEON.
- (5) 2.00 p.m.—*Atopic Dermatitis*, Drs. H. L. Bacal and S. Pedvis (by invitation), Montreal.
- (6) 2.30 p.m.—*The Present Status of Therapy of Rhus Dermatitis*, Dr. R. F. Hughes, Hamilton.
- (7) 3.00 p.m.—*Dandelion as a Cause of Hay Fever*, Dr. H. C. Jamieson, Edmonton.
- (8) 3.30 p.m.—*Grass Pollen Antigens*, Dr. John Fitzgerald, Roosevelt Hospital, New York.
- (9) 4.00 p.m.—*Premenstrual Tension in Asthmatics Treated with Testosterone Progesterone and other Drugs*, Dr. Mary Sander-son Young, Windsor.

CANADIAN UROLOGICAL ASSOCIATION

Tuesday, June 22, 1948. A full and varied program has been arranged for presentation in several Toronto hospitals. Full details will appear in the June issue of the *Journal*. The Annual Dinner of the Canadian Urological Association will be held in the Royal York Hotel at 7 p.m.

CANADIAN ANÆSTHETIST'S SOCIETY

Wednesday, June 23, 4.30 p.m., Tudor Room, Royal York Hotel, C.A.S. Annual General Meeting.

Thursday, June 24, 4.30 p.m., Tudor Room, Royal York Hotel, C.A.S. Meeting of Council; C.A.S. Divisional Meetings; 6.00 p.m., C.A.S. Annual Reunion and Dinner, Hall B.

CLASS OF MEDICINE, 1910,

UNIVERSITY OF TORONTO REUNION DINNER

Thursday, June 24, during the annual meeting of the Canadian Medical Association, Royal York Hotel, Toronto. Tickets and other information may be obtained at registration desk.

THE CANADIAN HEART ASSOCIATION

Tuesday, June 22:

Business Session: 10 to 12 a.m.—Consideration of Constitution and election of officers.

Scientific Session: 2 to 5 p.m.—

- (1) *Vector Cardiograph*, Drs. L. Hession and A. C. Burton.
- (2) Guest speaker (to be announced).
- (3) *Ectopia Cordis*, Dr. Neil Feeney.
- (4) *Angio-Cardiography in Congenital Heart Disease*, Dr. John Keith.
- (5) *The Genesis of Ventricular Fibrillation: The Nature of the Vulnerable Phase of Cardiac Cycle*, Dr. Hebbel Hoff.

MEETING OF NEUROLOGISTS

An organization meeting for the formation of a Canadian society to include neurologists, neurosurgeons and those interested in neurobiology will be held in Toronto at the time of the Canadian Medical Association meeting. All those interested are invited to attend.

The meeting will take place at 2 p.m. in the Royal York Hotel on Tuesday, June 22. Location of the meeting room will be posted in the hotel. Dr. J. C. Richardson of Toronto has consented to act as chairman of the organization meeting.

THE FEDERATION OF MEDICAL WOMEN OF CANADA
GIFTS OF FOOD FOR BRITAIN

The Federation of Medical Women of Canada has adopted, as a project, the sending of food parcels to the families of our colleagues in Britain.

During the Canadian Medical Association convention in Toronto, a booth under the auspices of the Federation of Medical Women of Canada will be available, with a display of sample parcels of food, where orders may be left or contributions of money made toward food gifts. It was suggested that while many medical men and women in Canada fully realized the urgency for sending food parcels, they had no direct contact with anyone living in the British Isles. Letters were written exploring the situation, and the enthusiastic, prompt and almost pleading replies assured us of the wisdom of the plan. The Royal Medical Benevolent Fund and Epsom College were both contacted by Dr. Doris Money-penny. Both organizations assist financially or educate the dependents of medical men who as civilians were killed or disabled during the bombing. One group receives no army pension and in many cases are endeavouring to maintain homes on exceedingly meagre incomes. The Royal Medical Benevolent Society also assists elderly doctors and the widows of medical men requiring financial aid. Major A. L. Giffard, secretary of Epsom College, wrote as follows:

"Thank you very much for your letter of February 18 and for your kind and generous desire to send gifts of food to medical people in England. This foundation educates up to fifty young sons and daughters of medi-

cal men, many of them orphaned during the bombing, whose parents have little means at their disposal. It is the greatest struggle for the mothers to keep going during the holidays. We are enclosing suitable lists, after checking with the Royal Medical Benevolent Society, and suggest that we look after the needs of the younger age group, while the Royal Medical Benevolent Society looks after the aged in the distribution of food gifts."

The booth will be open during the days of the annual meeting and contributions of money will be received, or orders taken for standard parcels to friends or to names on the list supplied by the two societies. You will be enjoying a holiday in Toronto, share the fun by sending a food parcel to someone in England. If you are unable to attend the convention, and wish to send a contribution toward financing these gift parcels, mail your contribution to: Dr. Hollie H. McKinnon, 16 Eastbourne Ave., Toronto.

All parcels will be acknowledged direct to the sender.

THE CAMSII COLUMN

12th Annual CAMSII Conference

Plans for the staging of the 12th Annual CAMSII Conference are being considered by the National Executive. The conference will be held at the University of Toronto, in November of this year. It has occasionally been suggested to executive members that the general student body has not had a sufficiently close relation with the governing body of the CAMSII, and that as a whole, students know CAMSII only for the services it renders. If such is the case, CAMSII has then been thus far defeated in its main purpose, and efforts must be made to bring CAMSII to its members in order that it shall be made clear to them what advantages there lie in there being a national organization of medical students. A first move in such an effort might be to point out to each student that it is he who makes the CAMSII a national body, as can be illustrated by outlining here the functions and purposes of the National Conference.

At the Conference, the National Executive and two delegates from each medical school make up the General Council. The National Executive may introduce motions and may participate in discussion of motions, but the executive members do not vote. The delegates may introduce motions, discuss them, and it is they who vote.

Some time before the Conference the local officers are requested to consider and prepare any motions they may wish to present at the Conference on behalf of those students they represent. It is by this means that the students' opinion may gain consideration inasmuch as it is the duty of the local officer to seek such opinions, interpret them in the motions he will present, and of course be sure that they do reach the Conference.

The motions passed will govern the course of the organization throughout the following year. Generally these motions fall into two main divisions; first, those instituting constitutional amendments and outlining policy, and second, those outlining activities for the year to come.

Each medical school is asked to choose a slate of officers to function as the National Executive for the following year, and the delegate presents this slate to the Council which chooses one from those submitted. It becomes the duty of the new executive to carry out the program and policy as elaborated by the Conference delegates. The executive cannot act but on the authority of the Council, they must carry out the activities planned for the year, and must submit to all CAMSII members

for ratification any motions passed by the Council which involves constitutional change or statement of policy.

Thus it is evident that the affairs of CAMSI are the affairs of the members in it. It is they who present the program to be followed by the executive they elect, and it is to them that the executive must report upon the end of their term of office. It is therefore the duty of all members to express their opinions to their local representatives, and request that they be given a "national consideration".

DONALD B. MCCONACHIE
National Director of
Public Relations CAMSI

MEDICAL SOCIETIES

Calgary Medical Society

Regular meeting held March 2, at the Col. Belcher Hospital, Dr. H. V. Morgan in the Chair and Dr. L. M. Fairbairn, Secretary.

A discussion was held on the voluntary prepaid medical insurance problem, dealing chiefly with the proposed contract between Alberta Medical Services Incorporated and the medical profession. Dr. Richardson, as our representative on the Council, and also as a member of the Economics Committee, explained the necessity of this contract being brought forward at the present time, due to the bill to incorporate this body being before the Legislative Assembly at the present time. He pointed out that it was not by any means final and that suggestions for alterations of the various clauses would be considered by the Economics and Legislative Committees. To conclude the discussion the following resolutions were passed:

1. We are not in favour of initial office call and house call coverage in the insurance. It was felt that such coverage could lead to unnecessary calls and also, if they were not included that the cost to the patient for the more essential coverage could be considerably lower.

2. We are in favour of the elimination of the word "minimum" with reference to schedule of fees on all items throughout the contract. It was the opinion of the meeting that the elasticity of the schedule should be maintained. Various items of service coverage should not necessarily be chargeable as the minimum fee.

3. It is advised that all open clauses should be eliminated in the contract.

4. It is advised that there should be clarification of Section 9, making it clearly refer to the payments of accounts for service rendered, and not refer to discipline of the profession, which is the duty of the legal body of the profession, namely the College of Physicians and Surgeons.

5. It is strongly advised that the period of time after which penalty is made for late submission of accounts be lengthened to 90 days instead of 30 days following the month in which the services were rendered.

W. C. WHITESIDE

Meeting of Medical Chirurgical Society

A special meeting of the Montreal Medico Chirurgical Society was held on March 30. Dr. Charles Read, of Chelsea Hospital, London, England described the circumstances connected with the National Health Service in Great Britain. Dr. Read briefly sketched some of the background of the subject showing that in the past twenty years various proposals had been made by the British Medical Association towards improving the distribution of medical services. The present situation is that an Act for instituting a National Health Service has been passed by Parliament and will come into effect on July 5. The profession however by plebiscite has shown overwhelming disapproval of some of the terms of the Act. The opposition is not to the Act as such, for it is recognized that an effort is being made to im-

prove distribution of services, but to certain aspects, such as: (1) payment of basic salaries, which it is felt will lead to state medicine; (2) direction of practice; (3) absence of right to appeal to the civil courts.

Perhaps the method of payment by salary was the most bitterly opposed point. The profession felt that it was the thin end of the wedge of an entirely state paid service, than which nothing was more repugnant. If these points could be settled there is no doubt that the British profession would agree to working under the Act. But negotiation with the Minister of Health had been impossible, hence the present impasse.

It has been of special interest in analyzing the returns of the plebiscite by groups, to find the tremendously high proportion of medical men actually in government salaried positions who showed disapproval of the terms of the Act. This disapproval was equally strong amongst the younger medical men.

It remains to be seen of course how completely the Act can be implemented with such a large proportion of medical men refusing to work under it.

London Academy of Medicine

London Academy of Medicine heard Professor D. L. C. Bingham of Queen's University on March 25, his subject was "Intra-medullary Fixation of Fractures". The use of the Kuntschner nail technique was demonstrated by lantern slides and the citation of cases in which it was used to immobilize fractures of femur, tibia and humerus. At the same meeting Dr. Edward F. Brooks, Chief of Department of Medicine St. Michael's Hospital Toronto, discussed "Diagnosis Leading to Treatment in the Unconscious Patient".

The Seventh Annual Medical Alumni Lectureship in the Faculty of Medicine University of Western Ontario was an important event. The session lasted from April 7 to 9. Professor R. H. Smithwick, Professor of Surgery, Boston University, was the guest lecturer. Professor Smithwick took a part in the programs of each of three days. Members of the Faculty presented papers and gave demonstrations. A large number of University of Western Ontario Alumni and other practitioners from Western Ontario enjoyed the well chosen list of lectures.

The Activities of the St. Francis Valley Medical Society

At the first meeting of the season held in Sherbrooke, Dr. N. Philpott, Chief of Staff of the Montreal Maternity Hospital, with several members of his staff, presented papers dealing with such problems as breech presentation, obstetrical anaesthesia and the Rh factor. The second meeting was given over to the discussion of modern concepts in the diagnosis and treatment of hypertension. Dr. John Howlett and Dr. Arthur Vineberg of the Royal Victoria Hospital Staff discussed the medical and surgical aspects of the question.

In January the Society was entertained at the St. Francis Sanatorium by Dr. Lasalle Laberge and his staff. Papers were presented by Drs. Doyle and Marcus and a demonstration was provided showing micro-films and their use in mass examination for tuberculosis. Dr. Jacques Olivier demonstrated newer techniques in the examination of sputum for tuberculosis. An excellent buffet lunch was provided by the Sister Superior of the Institution following the meeting. The March meeting was held at the St. Vincent De Paul Hospital. This meeting was completely bi-lingual and took the form of a Pathological Conference. The cases were presented in one language and a résumé was presented in the other. This was the first attempt at a Clinical Pathological Conference and Dr. Olivier and his staff presented an excellent collection of pathological specimens. The case histories were presented by the clinicians who had seen the cases. The meeting was made particularly interesting by the use of a new micro-projector. Here again the Sister Superior and the Staff of the Dietetics

Department of the Hospital provided an excellent buffet supper.

The meetings have all been well attended and there is considerable interest in the forthcoming meeting of the Canadian Medical Association, Quebec Division, in Sherbrooke in April.

M. W. HICKS, *Secretary*

Winnipeg Medical Society

Dr. Wallace Wilson, immediate past president of the Canadian Medical Association, addressed the Winnipeg Medical Society on February 6, on the Canadian Medical Association program to investigate complaints of the general practitioners. He stated that a questionnaire dealing with problems of general medical practice in Canada would be sent to all general practitioners in the Dominion. He said that medical schools had been criticized as not fitting the medical student for general practice. The general practitioners would be asked in what way the schools had failed, also whether a special group for general practitioners should be set up in the Canadian Medical Association, and whether the first class general practitioners would be recognized as such. He hoped that a program of clinical research to be carried out by general practitioners would soon be in operation.

Dr. A. T. Mathers, dean of the medical faculty, welcomed the members of the medical society and invited them to view the alterations and changes in the college during the past year. He mentioned the increase in enrolment of medical students necessitated by the large number of veterans wishing to study medicine. He said that the selection of students should not be by marks nor aptitude alone, but by incentive and emotional stability as well. Present day physicians, although scientifically more advanced than their predecessors, could take a lesson from the old-time doctors in developing the human instinct in dealing with people, he felt.

Other speakers were Dr. I. M. Thompson, professor of anatomy, Dr. H. V. Rice, Dr. D. Nicholson, Dr. Bruce Chown and Dr. J. D. Adamson.

During the tour of the college, special attention was paid to the medical research division, one of the newest developments of the college. A machine shop where students can make special equipment has been installed with funds from the Manitoba Institute for Medical Education and Research. Other new features include a micro-photographic camera and an electrically-operated kymograph.

La société médicale des hôpitaux universitaires de Québec

Société médicale des hôpitaux universitaires de Québec le 19 décembre, 1947.

UTILISATION DE FACIA ET PROLAPSUS CHEZ LES HYSTERECTOMISÉES.—F.-X. Demers.

Dans ces cas, l'auteur préconise de compléter la colpoperinéoraphie par une laparotomie qui permet de soutenir l'aponévrose vaginal par deux languettes de facia prélevées au voisinage de la ligne blanche. Les languettes sont ancrées aux moyens fibreux des ligaments ronds et aux angles internes du vagin ou au moignon du col chez subtotalisées. La corde ainsi formée est enfouie sous la séreuse.

INFARCTUS DU MYOCARDE ET CHOLESTÉROL; RAPPORT PRÉLIMINAIRE.—H. Laliberté et M. Vachon.

L'absence de lésions artérielles évidentes ou d'autre maladie chronique, rend difficile le diagnostic étiologique chez les jeunes qui meurent d'infarctus du myocarde. Des observations nombreuses ont conduit à étudier le rôle du cholestérol dans la genèse des thromboses vasculaires, et plus particulièrement, coronariennes. Sept observations sont rapportées de malades ayant présenté un infarctus, et chez qui une surcharge cholestérolée

paraît bien à l'origine de cet accident. En conclusion, il vaut la peine qu'on fasse un dosage du cholestérol sanguin chez tout patient, surtout un jeune, souffrant d'angor, qu'aucune cause ordinaire ne peut expliquer. Si cette hypothèse est exacte, une hygiène alimentaire bien dirigée contribuera à épargner des vies.

DEUX CAS DE CORPS ÉTRANGERS DE L'ESTOMAC.—A. Petitgrew.

Le premier cas est celui d'un corps piquant, une épingle à chapeau, ayant perforé l'estomac d'un enfant de six ans et habitant à la fois l'arrière cavité des épiploons, l'estomac et le duodénum, avec péritonite localisée. Le deuxième cas est celui d'un corps piquant plus petit, une aiguille de couturière, transfixant la paroi postérieure du pylore chez une jeune fille de 27 ans à psychisme particulier et avec un passé chargé de treize hospitalisations et de huit opérations et se présentant avec un iléus paralytique.

La radiographie et la radioscopie nous ont aidé à situer l'aiguille à chapeau et à diagnostiquer la présence de l'aiguille de couturière.

Les corps étrangers de l'estomac sont de deux espèces: les corps mous ou Bézors qui peuvent se diviser en Trichobézors, en Phytobézors ou en Trichophytobézors; les médicaments minéraux et le shellac. Les corps durs sont soit: mousses comme les sous, les marbres, soit à aspérités comme les portions de verre de fourchettes, etc. Ces corps peuvent passer facilement tout le tube digestif ou s'arrêter et même perforer une partie de ce système et peuvent venir soit du dehors par la déglutition soit de l'abdomen même.

Le Bézors présentent tous la même symptomatologie. La différenciation d'avec une tumeur maligne est souvent difficile. L'histoire du patient pourra nous faciliter le diagnostic.

Le deuxième cas montre un aspect neuro-psychiatrique que nous oublions trop souvent malheureusement et la question se pose si un corps étranger situé au pylore peut déterminer seul un iléus.

LA DIARRHÉE ÉPIDÉMIQUE DU NOUVEAU-NÉ.—Broquerie Fortier.

Depuis quelques années une nouvelle entité clinique est décrite en différents pays; tout d'abord aux États-Unis, puis en Belgique et en France. Ce nouveau syndrome ne sévirait que chez le nouveau-né. Il a reçu le nom de "Diarrhée épidémique du nouveau-né," ou plus exactement celui de "Syndrome toxi-infectieux épidémique du nouveau-né". Des observations rapportées il découle que: (1) Les conditions étiologiques sont assez particulières, l'agent causal est inconnu, la maladie est épidémique atteint le nouveau-né vers le 13^{ième} jour, survient de préférence chez des enfants nourris artificiellement. (2) Le syndrome clinique est caractérisé par un syndrome neuro-toxique, et une déshydratation excessive. (3) L'évolution est rapidement mortelle, 2 à 5 jours. (4) La thérapeutique doit être diététique et réhydratante.

Le régime est hydrique, hypograissex, hyperprotéiné. Les sérums employés sont le sérum de Hartman et le sérum glucosé alternativement ou concomitamment. Notre mortalité globale a été de 42. 85%.

UN NOUVEAU MÉDICAMENT ANTI-CONVULSIF; ESSAI CLINIQUE. RAPPORT PRÉLIMINAIRE.—C.-A. Gauthier.

Le but du travail est de présenter un nouvel agent thérapeutique, le tri-méthyl, 5, 5 phényl-éthyl-hydantoin, connu sous le nom de mesantoin, et d'en apprécier l'action frénatrice sur le cortex moteur. Son affinité avec le déphényl hydantoinate sodique est considérée et leur toxicologie comparée. Son effet, après essai clinique, sur dix cas, choisis au sens péjoratif, est résumé et étudié. Des commentaires sont offerts avec la réserve que peut impliquer la présentation de ce qui n'est qu'un rapport préliminaire et que le temps et l'observation se chargeront d'informer ou de confirmer.

CORRESPONDENCE

Radio Interference

To the Editor:

In regard to your explanatory editorial on page 291 of the March issue of the *Journal*, I cannot see how the Government of Canada's argument about interference with shortwave machines can hold water. The same machines are sold on both sides of the International Boundary and carry wave lengths that travel up to a hundred miles. If our Canadian machines interfere with aerial and ship navigation, certainly the American machines just south of us, which are in no way screened, will interfere with the air signals on our aeroplanes and ships, and Canada has no control over them. This point seems to have been missed in all the arguments I have seen. If this is so and I am assured it is a fact it seems rather futile for Canada to adopt such an attitude, and it has cost many a doctor the use in his work of a useful adjunct to treatment, as he cannot procure except at heavy expense a new machine or the materials to screen his machine. Then think of the cost to hospitals of altering or buying new diathermy apparatus.

The Canadian Medical Association should endeavour to protect its members from imposition of this type.

E. W. BOAK

114 Pemberton Building,
625 Fort Street,
Victoria, B.C.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

THE CRISIS

To return to London after a two-months' absence abroad is to be able to appreciate to the full the dramatic worsening that has occurred in the relationship between the British Medical Association and the Government concerning the Health Act. The gloves are off, and every statement from one side is immediately countered by an equally strongly worded reply from the other. The "tyrants" of Whitehall glibly accuse the British Medical Association of "sabotage" or of consisting of a coterie of old gentlemen entirely unrepresentative of the profession as a whole. Whilst the British Medical Association has issued writs for libel against a well-known daily newspaper and against a group of doctors who are prominent members of the Labour Party.

Amidst all this welter of acrimony there is little evidence of that "sweetness and light" which Matthew Arnold considered to be the hallmark of educated men and women. That the profession should have become involved in such an unseemly controversy is deplored by no one more than the members of the profession themselves, and it must be confessed that in their dealings with the Minister of Health the British Medical Association have tended to lay themselves open to the accusation (quite unjustifiably, let it be added) of being more interested in their own future than in the welfare of their patients. It is, for instance, only too noticeable that even papers of the standing of *The Times* and *The Spectator* find it necessary to criticize certain of the actions of the British Medical Association. What is the reason that has brought about this distressing state of affairs?

PROFESSIONAL FREEDOM

Fundamentally the root of the trouble is the average doctor's fear of losing his professional freedom, and to this extent it is fair to say that the vast majority of the profession are politically opposed to the scheme. It is

their misfortune that medicine is the first profession to be brought under government control. This is such a revolutionary move in the home of Magna Charta that it is inevitable that it should produce an intense emotional reaction. It is only necessary to consider what would be the reaction of lawyers or journalists to such a suggestion to appreciate how deeply the full implications are resented by the doctors of the country.

THE DOCTOR-PATIENT RELATIONSHIP

Of almost equally fundamental importance is the unique relationship that exists between the patient and his doctor. This is one of those emotional relationships which can never be adequately defined in words, and one which is much too personal to be capable of inclusion in an Act of Parliament. To attempt to legislate for such a relationship is to appreciate the dangers that exist for all of us in a rationalized State, far less a totalitarian one. Here again the political implications of the present lamentable dispute come to the fore. The sanctity of the home and the freedom of the individual are two concepts that tend to be too brusquely pushed aside by the modern planner. Rationalization may well be a necessity in these days, but the wise statesman must realize that in following such a course, if individual freedom has to be restricted for the sake of the community, then the restrictions must be imposed gradually and cautiously.

THE DOCTOR AS A GOVERNMENT OFFICIAL

Finally there is the inevitable reaction of the individual doctor to the differences which exist between the statements of the Minister of Health and of the party of which he is a leading member. The Labour Party has declared itself wedded to the idea of a whole-time state medical service. This means that no matter what promises the Minister of Health may give, it is assumed that the present scheme is merely a step in the direction of such a state service. To deny this is mere political chicanery which deceives no thinking man or woman.

THE POSSIBLE SOLUTION

It is against such a background that the present impasse must be viewed. That a solution must be found, and found quickly, is all too clear. Whilst it is not too late, even yet, for the Minister to take the wisest step of all and decide to introduce the scheme gradually rather than in one fell swoop, it is practically certain that this will not occur. Although such a step would undoubtedly be the one certain method of attaining the greatest good of the greatest number, at this late stage it would require a magnanimity and courage that few politicians possess. The only other alternative that appears possible is that the Prime Minister should intervene personally. If he were to approach the Presidents of the Royal Colleges and the Vice-Chancellors of the Universities with a view to seeking their help, then there is little doubt that the outstanding points of dispute could be settled. Time, however, is running short, and if even statesmanship, hitherto all too sadly lacking, is to save the situation, then it must be displayed immediately.

WILLIAM A. R. THOMSON

London, April, 1948.

Life calls for obedience, in some measure, many steps of the way. There are hard and fast rules for living. But blind obedience should never be required of anyone, child or adult. There must be a good reason for every order, and justice and justification of every injunction should be clearly understood by those required to comply with it. A child taught to be obedient for the common good of the family will grow up to be a good citizen, ready to co-operate for the welfare of the community as a whole.

ABSTRACTS FROM CURRENT LITERATURE

Medicine

The Course of Rheumatoid Arthritis in Patients Receiving Simple Medical and Orthopaedic Measures.
Short, C. L. and Bauer, W.: *New England J. Med.*, 238: 142, 1948.

There is no specific treatment for rheumatoid arthritis and the assessment of any form of therapy is difficult because of lack of adequate knowledge of the natural course of the disease. In order to obtain some information concerning this point a study was made of 150 cases treated only by simple medical and orthopaedic measures. After an average period of ten years 50% showed a definite degree of improvement and 15% were considered to be in remission. Factors which would appear to improve the prognosis in rheumatoid arthritis are sex (male), age (less than forty), and duration (less than a year). Good nutrition and mild symptoms are also in favour of the patient.

NORMAN S. SKINNER

The Efficacy of Maintenance Doses of Digitalis in Preventing the Recurrence of Congestive Heart Failure. Ladue, J. S. and Carter, S. B.: *Ann. Int. Med.*, 27: 923, 1947.

Of the 104 cardiac patients studied, 45 were admitted to the hospital for recurrent congestive heart failure during a test period in which digitalis folia was withheld. However there were only 20 admissions during a period in which these same 104 patients were taking maintenance doses of digitalis. The transverse diameter of the heart is not appreciably affected by the taking of digitalis over a period of two to twenty-four months, in the fully compensated patient with heart disease associated with regular sinus rhythm.

Patients with heart disease have a definite diminution in the vital capacity and a prolongation of the circulation time even in the absence of congestive heart failure. Measurements at frequent intervals of the vital capacity, circulation time, venous pressure and weight failed to demonstrate the efficacy of maintenance doses of digitalis significantly to improve the cardiac reserve of patients with heart disease associated with regular sinus rhythm. Maintenance doses of from 0.1 to 0.3 gm. of digitalis folia should be given to patients with heart disease associated with regular sinus rhythm. None of the criteria employed in this study gives an accurate appraisal of the proper maintenance dosage of digitalis for patients with heart disease associated with regular sinus rhythm.

S. R. TOWNSEND

Neurologic Disturbances with Folic Acid Therapy.

Wagley, P. F.: *New England J. Med.*, 238: 11, 1948.

Ten cases of pernicious anaemia, controlled by liver extract, received folic acid as the only means of treatment. No haematologic relapse occurred but in eight patients neurologic disturbances developed or recurred. Glossitis appeared in three cases during folic acid therapy and this method of treatment would appear to entail a definite risk of injury to the nervous system in pernicious anaemia. In other macrocytic anaemias folic acid caused a dramatic improvement in one case of tropical sprue, caused an excellent improvement in one case of non-tropical sprue while another such case did not show response to folic acid or liver extract. Combined folic acid and liver extract therapy brought about a slow improvement in one case of macrocytic anaemia following total gastrectomy.

NORMAN S. SKINNER

Syphilis. Crawford, G. M.: *New England J. Med.*, 238: 121, 1948.

This is the first part of a review of the present conceptions on diagnosis and therapy of syphilis by the Acting Head of the Departments of Dermatology in Harvard Medical School and Massachusetts General Hospital. The survey is very complete but compressed and therefore those interested are recommended to read the original.

The undesirability of establishing the diagnosis on purely serological grounds is emphasized. This is coupled with the observation that reliance on serological findings is often necessary and unavoidable. In 82,070 male maritime recruits 783 had positive reactions to the standard Kahn test. In 47% a diagnosis of syphilis was eventually made. Weakly positive reactions proved to mean syphilis in only 20% of this group; 13% had persistent positive reactions which were non-syphilitic, which is regarded as an unusually high percentage. Of non-syphilitic diseases giving positive reactions, the highest percentage comprises those from what the author terms the 3 "syphiloid" diseases: yaws, bejel and pinta. Leprosy, malaria, vaccinia and infectious mononucleosis are next in order of frequency. Many other diseases cause occasional positive tests, such as upper respiratory infections, lymphogranuloma venereum, variously caused hyperpyrexias, serum treatments and immunization procedures. Lupus erythematosus, both the chronic circumscribed and the acute disseminate forms, may show positive reactions at some time in their course. Non-specific positive serologic tests, particularly the precipitation and flocculation tests are becoming more common. A thoroughly conservative attitude in the serologic diagnosis of syphilis, in the absence of confirmatory history, is urged. In such a situation a disagreement between the complement-fixation and precipitation tests, especially if the latter only is positive, warrants suspicion. With quantitative tests, repeated fluctuating and low titre reactions indicate that the patient is probably not infected. An acute infection within 30 to 60 days prior to the test, especially if a precipitation test only is used, demands prolonged repetition. Dependence upon one type of test or on one laboratory is undesirable. The great value of the quantitative test is in the follow-up of infants born of syphilitic mothers. A steady drop in reagin titre indicates disappearance of reagin carried over from the mother's blood, and a non-infected child; while rising or persistently elevated titre indicates an infected child.

Reports continue to appear on the short intensive courses of arseno-bismuth therapy. In general, even under expert supervision, the shorter and more intensive programs (some as short as 20 days) were found to be inherently toxic, making them unjustifiable compared with penicillin or penicillin combined with chemotherapy. Longer schedules (26 weeks) showed better tolerance, fewer reactions and generally satisfactory results. Dichlorophenarsine hydrochloride has rapid spirocheticidal effect, lesions heal quickly and serologic reversal is favourable. Reactions are generally mild and infrequent.

D. E. H. CLEVELAND

Streptomycin in the Treatment of Tuberculosis in Humans (Pulmonary Tuberculosis). Muschenheim, C., et al.: *Ann. Int. Med.*, 27: 989, 1947.

The administration of streptomycin for periods of 42 to 120 days to 43 patients with pulmonary tuberculosis was followed, in every instance, by some degree of measurable improvement in the status of the disease. Of 18 patients followed six weeks or longer after treatment, whose pulmonary lesions were predominantly exudative in nature, 9 attained satisfactory early remissions, during or shortly after the cessation of the anti-microbial therapy. Of these, 2 relapsed within six months, requiring collapse therapy, and a third relapsed within 12 months. Another 6

patients showed considerable improvement under streptomycin therapy, but fell short of attaining full remission. The suitability of these cases for collapse therapy, however, was appreciably enhanced and this was subsequently undertaken in 5 with apparent success. In 3 patients there was no significant benefit, and a short period of symptomatic improvement was followed by early resumption of the progressive course of the infection.

Less striking changes were observed in another 18 patients, also followed six weeks or longer, with chronic fibrocavernous disease. Four had fully satisfactory early responses and 4 more attained favourable results when the anti-microbial therapy was followed by thoracoplasty. In 10 of the 18 cases there was a short period of temporary improvement but no lasting benefit. Strains of tubercle bacilli which were highly resistant to the action of streptomycin *in vitro* were obtained from 10 of 11 patients who continued to discharge bacilli during 75 to 120 days of chemotherapy. The incidence of drug resistant strains of bacilli was much lower where streptomycin therapy was continued for only 42 days. In every instance in which relapse occurred after the appearance of streptomycin-resistant organisms, the course of the infection was completely uninfluenced by the further administration of streptomycin.

S. R. TOWNSEND

Surgery

Calcification of the Supraspinatus Tendon: Infiltration Therapy with Local Anæsthesia and Multiple Needling. Norwich, I.: *Surg., Gyn. & Obst.*, 86: 183, 1948.

The deposit of calcium in the tendon is believed due to low carbon dioxide tension and high alkalinity resulting from a diminished blood supply. Calcification without symptoms is present in 2.7% of people. Acute or chronic tendinitis may follow rupture of some of the degenerated fibres by trauma. Local anæsthesia and multiple needling of the deposits, without open operation may result in prolonged relief from pain and limitation of movement. It is essential that the shoulder be moved immediately and continuously after such treatment. X-rays show the rapid absorption of calcified material in such acute lesions.

BURNS PLEWES

Management of Injuries to Large Blood Vessels in Wounds of Violence. Herrmann, L. G.: *Am. J. Surg.*, 74: 560, 1947.

Bleeding from peripheral vessels should be controlled by vertical elevation and direct pressure rather than by tourniquet and hæmostats. Packing the wound with gauze or gelatin sponges and bandaging will control most bleeding till shock can be treated and operation arranged. Tangential wounding of large arteries often is followed by such extensive soft clots that collateral vessels are occluded and thrombosed. A local pulsating hæmatoma may develop into a false aneurysm. Arterio-venous aneurysms with early acute cardiac decompensation may require early operation.

When the common carotid is to be occluded, Matas' suggestion of using an aluminum band which can be removed if hemiplegia threatens, is recommended. In the presence of adequate collateral arterial circulation, ligation of a wounded main vessel is preferable to repair. Local heat to relieve vasospasm is dangerous because it increases tissue metabolism more than arterial flow, so alcohol per os or intravenous tetraethylammonium chloride is valuable. Pavæx therapy, warming the opposite limb, lumbar sympathetic block are useful to improve collateral circulation.

During the early postoperative period, very frequent examinations are advised and the author again recommends oral alcohol, papaverine, sympathetic block, moderate lowering of the part for ischæmia, elevation for cyanosis, and heat must never be used for the affected limb. Heparin and dicumerol are valuable. When the main artery of a limb has been interrupted, that limb is never normal again.

BURNS PLEWES

Hypermobile Flat Foot with Short Tendo Achillis. Harris, Col. R. I. and Beath, Major T., R.C.A.M.C.: *J. Bone & Joint Surg.*, 30A: 116, 1948.

Based on the survey of 3,600 recruits in the Canadian Army the authors divide pes planus into three varieties: (1) Hypermobile flat foot with short tendo Achillis. (2) Peroneal spastic flat foot. (3) Simple depression of the longitudinal arch.

Their paper concerns the first type which is the common form of severe pes planus in childhood and young adult life. They present a new concept as the cause, namely, inadequate support to the head of the talus by the calcaneus. This can be demonstrated by supero-inferior roentgenograms. The clinical features are a prolonged history of foot disability, a flat foot deformity which disappears when the weight is taken off the foot, a short tendo Achillis, hypermobile mid-tarsal and subtalar joints, and a characteristic deformity.

Treatment is determined by the age of the patient and the severity of the lesion. In childhood and adolescence various forms of foot supports, coupled with muscle exercises are used. In young adults with severe disability fusion of the talonavicular joint, and the joint between the neck of the talus and sustentaculum tali has been carried out. Too short a period has elapsed to assess this method of treatment. A mode of life demanding a minimum of the feet must be aimed at in the severe cases.

H. M. COLEMAN

Orthopædic Surgery and its Place in the Department of Surgery in Our Modern Medical Schools. Abbott, L. C.: *J. Bone & Joint Surg.*, 29: 840, 1947.

Orthopædic surgery as defined by Sir Robert Jones, "The treatment by manipulation, operation, re-education and rehabilitation of the injuries and diseases of the locomotor system", represents the largest special field in the Department of Surgery in most American medical schools. However, it still remains a sub-department in most centres, dominated by the department of general surgery, which is itself a specialty confined largely to the surgery of the abdomen and neck.

Orthopædic surgery was not taught as a specialty until 1887, and its modern development can be traced to the foundation of the American Orthopædic Association. Previous to 1900 the only major orthopædic surgery was destructive in character. Operative correction of deformities soon became more general. In 1911 Albee introduced the use of the bone graft. During World War I great strides were made. The application of simple fundamental principles of orthopædic surgery to compound fractures produced amazing results. The field has become so extensive that it seems not improbable that various specialties will develop within orthopædic surgery. In the treatment of fractures fundamental principles of treatment should be employed with avoidance of complicated contrivances involving multiple penetration of the bone, except where experience has shown they are absolutely necessary.

A questionnaire sent to fifty-three medical schools showed only one-third of the orthopædic divisions to have autonomy. The treatment of injury, infections and tumours of bones and joints has become the province of the orthopædic surgeon. Amputations are evenly divided between orthopædic and general surgeons. The author recommends full recognition of orthopædic surgery as a major department of surgery integration in the Department of Surgery and close liaison with the other divisions from both teaching and clinical standpoints.

H. M. COLEMAN

Rôle of the Sympathetic Nervous System in Traumatic Surgery. Pretty, H. G.: *Am. J. Surg.*, 74: 527, 1947.

Interruption of the sympathetic reflex arc is an important adjunct to traumatic surgery especially when there is a pre-existing sympathetic imbalance. Crush injury, Sudek's atrophy, traumatic phlebitis, fractures with massive œdema, causalgias may all be benefited by

this method. Refrigeration relieves pain, reduces oedema and dilates capillaries, but when the limb returns to room temperature there is severe pain, oedema, blebs and fever. Therefore it should only be used when amputation is inevitable. Sympathetic interruption as soon as possible after injury similarly reduces pain, oedema and blanching and allows earlier reduction of fractures.

Tetraethylammonium chloride intravenously, 2 to 5 c.c. of 20% solution gives relief for up to two hours. Novocaine, procaine or alcohol lumbar sympathetic block through 3 or 4 needles gives longer relief. Ramisectomy for upper limbs, ganglionectomy for lower limb lesions are recommended.

BURNS PLEWES

Slipped Epiphysis in the Adolescent Hip. Martin, P. H.: *J. Bone & Joint Surg.*, 30A: 9, 1948.

The author believes that most poor results in slipped epiphysis of the hip are due to improper treatment on account of avascular necrosis in the epiphysis. Necrosis in the epiphysis is caused by further damage to its blood supply through the ligamentum teres and the periosteum on the posterior and inferior aspects of the neck. Manipulation should be condemned except in acute traumatic cases, and it should be gentle. If reduction is not easy, closed methods should be abandoned. Patients in the so-called preslipping stage and those with minimal slipping (less than one centimetre) are best treated by nailing *in situ* without reduction. When displacement is more than one centimetre, and is gradual or has existed longer than two weeks, open reduction should be done without preliminary manipulation. This must be accomplished with due respect for the blood supply of the epiphysis. In old united cases, if there is a good hip joint, intertrochanteric osteotomy may be beneficial. Later in life, arthroplasty offers much improvement for the old arthritic hips and especially for the cases with ankylosis.

GUY H. FISK

Obstetrics and Gynecology

A Comparison of the Accuracy in Diagnoses of the Vaginal Smear and the Biopsy in Carcinoma of the Cervix. Graham, R. M., Sturgis, S. H. and McGraw, J.: *Am. J. Obst. & Gyn.*, 55: 303, 1948.

A comparison of the diagnostic accuracy of the vaginal smear and the standard biopsy technique has been made in 181 cases of epidermoid carcinoma of the cervix. The first biopsy report was correctly positive in 90% of the series. The first vaginal smear report was positive in 91% of the same cases. By a combination of the two methods, the correct diagnosis was initially obtained in 178 cases, or approximately 99% of the group. The vaginal smear was more accurate than the biopsy in diagnosing the early carcinomas of the cervix in this series of cases. From this study of cervical cancer the authors conclude: first, that the vaginal smear is diagnostically as reliable as the biopsy taken in a large general hospital; second, that an extremely high percentage of cases can be diagnosed accurately if the two methods are used together; and finally, that the vaginal smear is of especial value in the diagnosis of the very early malignant lesions of the cervix.

ROSS MITCHELL

Penicillin Vaginal Suppositories and the Prevention of Postpartum Morbidity. Pierce, R. R.: *Am. J. Obst. & Gyn.*, 55: 313, 1948.

The use of penicillin in the form of vaginal suppositories at the time of delivery definitely reduced the puerperal rate on the author's service. This preparation should be of particular value in cases which become morbid after early rupture of the membranes, long labour and where genital tract infection is suspected. The use routinely of penicillin vaginal suppositories after delivery is justified because of the reduction of the nursing care required, in infected cases reduction of extra expense in number of hospital days required per

patient, and particularly a reduction in genital tract infection following delivery.

ROSS MITCHELL

Fetal and Neonatal Mortality. Greenhill, J. P.: *J. Obst. & Gyn. Brit. Emp.*, 54: 577, 1947.

Fetal and neonatal death-rates are high all over the world. In spite of distinct improvement, it is still possible to reduce drastically the number of deaths. Careful autopsy studies have shown that the chief causes of death are prematurity, asphyxia, birth-trauma, malformations, pneumonia, and maternal toxæmia. These 6 specific conditions are responsible for more than 70% of fetal and infant deaths. At the present time many of these deaths are not preventable, particularly those due to monstrous development and to non-viability. However, a large number of babies can be salvaged by (1) proper antepartum care, (2) prevention and treatment of prematurity, (3) prevention of birth injuries, (4) prevention and treatment of infections, particularly pneumonia and syphilis, (5) prevention and early treatment of the toxæmias of pregnancy, and (6) avoidance and prompt treatment of fetal erythroblastosis.

P. J. KEARNS

Leucorrhœa in Pregnancy A Further Study.

Chisholm, F. B. and Liston, W. G. in co-operation with Easson, E. P. T., Jacomb, R. G. and Kermack, W. O.: *J. Obst. & Gyn. Brit. Emp.*, 54: 592, 1947.

The vagina of the normal healthy pregnant woman has a reaction in the neighbourhood of 4.38, the mean T.L. being 0.032M. These conditions are associated with the bacterial flora of Type 1 and very few pus cells are present, but the epithelial cells of the vaginal wall contain abundant glycogen. A reduction of the normal acid level with a decrease in the amount of glycogen in the epithelial cells and a fall in the T.L. give rise to conditions favourable for the development of certain parasites. When the acid reaction of the vagina falls to a point around a pH of 4.8 the parasite of thrush, *Oidium albicans*, can flourish provided it has been able to secure a foothold; this is facilitated by the presence of glycosuria. When the acidity of the vaginal contents falls to a point at which the pH is about 5.3 the conditions are favourable for the growth of *Trichomonas vaginalis*. In such cases of *Trichomonas* infection very little glycogen is found in the epithelial cells and the concentration of T.L. is relatively low (average value 0.020M.).

P. J. KEARNS

Causes and Treatment of Tubal Occlusion. Snaith, L.: *J. Obst. & Gyn. Brit. Emp.*, 54: 607, 1947.

In the series of 800 cases of infertility, tubal occlusion is known to have been present in 130, and has been suspected in many others. Of these cases 60 had complete occlusion. Pregnancy had occurred in 30 cases where there was indication of significant tubal occlusion complete or partial: hormones played an important part in the treatment of 2 of these, and three were subject to major surgery. Twenty women became pregnant after insufflation or lipiodol, combined with hormone therapy in some cases. Of all cases of sterility 28% of the successful cures followed insufflation or lipiodol, though it is not certain that this procedure was responsible for success in all these cases.

P. J. KEARNS

Radiology

Analysis of Technical Factors and Results of Treatment in Carcinoma of the Cervix Uteri. Richards, G. E.: *Am. J. Roentgenol.*, 58: 783, 1947.

The paper undertakes to answer three specific questions relating to the problem of cancer of the uterine cervix. The first question is a comparison of the best surgical results with the best irradiation results. The evidence favours the latter. Second, radiotherapy is still making favourable progress and the figures quoted indicate that in the past few years there has been a gain of 20% in Stage I, 15% in Stage II, 5 to 6% in Stage

III, with little or no change in Stage IV. Further progress is still to be expected in the future and means to this end are suggested.

A detailed discussion of treatment by roentgentherapy and radium is included with charts showing total irradiation in roentgens delivered at 2 and 5 cm. from the mid-line of the cervix at the pelvic wall and also at the recto-vaginal septum. A new type radium applicator is described which appears to have certain advantages in the technical application of radium to the cervix.

Results of treatment at the Toronto General Hospital for the years 1929 to 1940 are published showing five-year survivals in Stage I, 74.0%; Stage II, 50.5%; Stage III, 26.8%; Stage IV, 4.9%; all stages, 35.6%.

R. C. BURR

The Treatment of Cancer of the Breast. McWhirter, R.: *Proc. Roy. Soc. Med.*, 41: 122, 1948.

This is a plea for the use of simple mastectomy in carcinoma of the breast cancer now in use in the Royal Infirmary in Edinburgh. It has been developed in an attempt to overcome the causes of failure of the radical operation.

When radical surgery is the only method of treatment available and when all cases coming to a large General Hospital are considered, I do not believe the five-year survival rate will be found to be higher than 20 to 25%.

Of 364 operable cases treated by radical operation, it was found that the number of cases developing recurrence in the chest wall, axilla and supraclavicular region of the side affected was almost 40% within five years of the time of the operation. Following the use of postoperative radiotherapy the 40% recurrence rate was reduced to 14%. Since 1941 in the Royal Infirmary the main method of treatment has been simple mastectomy followed by x-ray therapy. At first it may seem wrong not to dissect the axilla, especially in early cases. In these early cases the axilla may or may not be secondarily involved. If the axilla is not involved, it must be admitted that the radical operation is unnecessary, for extension of the operation to the axilla can do no good if there are no malignant cells to be removed. On the other hand if the axilla is secondarily involved it will be generally admitted that the results from radical operation are poor. This is the one fact that stands out in every published series of figures, and if one believes that radiotherapy has any part to play in the treatment of breast cancer, it is surely desirable to see what results may be obtained from the treatment of the axilla by radiotherapy. Figures show that with radical surgery alone in operable cases the five-year survival rate was 35.6%. In operable cases treated post-operatively by radiotherapy the five-year survival rate was 41% and in five-year operable cases treated by simple mastectomy and postoperative radiotherapy, the survival rate was 55.9%. The total cases treated by the latter method were 941. The findings, therefore, suggest that by not dissecting the axilla the risk of dissemination of cells to distant sites is reduced.

The following points are of importance in postoperative treatment by radiotherapy: (1) Only one full course of x-ray treatment should be given. The practice of repeated courses at intervals of three to six months has no place in the treatment of any form of malignant disease where cure is to be attempted and is just as illogical as partial removal of a tumour at intervals of three to six months. (2) X-ray treatment should be commenced as soon as possible after the operation; the usual interval is two weeks. (3) The chest wall must be treated by tangential or glancing fields so as to avoid lung fibrosis. (4) An adequate dosage must be given and in Edinburgh the patients receive a minimal tumour dose of 3,750r in a period of three weeks. (5) The x-ray apparatus must be sufficiently powerful to deliver an adequate depth dose in the axilla and it is doubtful if effective radiotherapy can be given with an apparatus of lower voltage than 250 k.v.

The author concludes that radiotherapy has been substituted for surgery in the treatment of the axilla and, therefore, a high standard of radiotherapy is essential.

R. C. BURR

Pathology

Parathyroid Adenoma with Generalized Metastatic Calcification. Young, M. O. and Halpert, B.: *Arch. Path.*, 44: 628, 1947.

This is the report of a case of a 49-year old white male who first presented himself in April, 1945, complaining of frequent episodes of vomiting not related to meals, followed in a few days by frequency of urination, nocturia up to 8 times per night, and slight dysuria. He also had a dull lumbar backache, vague pains in the arms and legs. During the next month increasing mental confusion developed. When admitted to hospital on May 29, his blood pressure was 146/80, non-protein nitrogen 67 mgm. %, urinalysis—occasional granular casts, no albumin, specific gravity 1.008 to 1.022. He was discharged with a diagnosis of "subsiding acute glomerulonephritis". He returned in November, 1946, when he noted increasing weakness and severe pains in the arms and legs following a cold. A mass was felt just above the manubrium 2 cm. in diameter. His blood pressure was 168/90 and urine showed only a few red blood cells in the sediment. His non-protein nitrogen varied from 35 to 150 mgm. %. Symptomatic treatment produced no improvement; he continued to have pains in the extremities, became anæmic, vomited frequently and died 19 months after the onset of the illness. The diagnosis was chronic glomerulonephritis with uræmia.

At autopsy a parathyroid adenoma was found in the region of the anterior surface of the body of the first thoracic vertebra. Numerous areas of calcification were found focally distributed in the glomeruli, tubules and vessels of the kidney, in the adrenals, heart, lungs, stomach, lymph nodes and in the intima and media of arteries all over the body. Deposits in a branch of the superior mesenteric artery to a loop of jejunum had caused thrombosis with infarction of the loop and generalized peritonitis. Several adenomas of the thyroid gland were present and terminal aspiration of vomitus had occurred. The authors considered that, in retrospect, the symptoms were typical of hyperparathyroidism and that it is possible to make the diagnosis during life. They felt that the deposits in the kidneys were sufficient to cause the fluctuating non-protein nitrogen.

S. D. KOBERNICK

Dermatology

Chemotherapy of Leprosy. Paget, G. H. and Erickson, P. T.: *J. Am. M. Ass.*, 136: 451, 1948.

At present investigators of the treatment of leprosy find themselves in a transitional period. Chaulmoogra oil is gradually being abandoned and replaced by the sulfone drugs, promin, diasone and promizole. The latter will probably in turn be replaced by better drugs, but they have already been used extensively with good results in the treatment of lepromatous leprosy, in which chaulmoogra oil has given disappointing results. Promin, the first of the sulfones to be used, is too toxic to be given by mouth in adequate dosage, but given intravenously in dosage gradually increased from 1 to 5 gm. daily has given consistently good results. Diasone is less toxic than promin and is given by mouth in a dose of 0.3 gm. once daily, very gradually increased to the optimal dosage of 0.3 gm. thrice daily. Promizole produces toxic reactions rarely and of mild intensity and is given in oral doses of 0.5 to 1 gm. daily, gradually increasing to the optimal dosage of 6 to 8 gm. daily. The toxic reactions, when they appear, are of the same character with all 3 drugs, the most frequent being a slow destruction of erythrocytes. Leukopenia, allergic dermatitis, nausea, vomiting and headache are infrequent

and not severe. Frequent urinalysis and red and white blood cell counts are necessary, and occasionally iron and liver are necessary to combat secondary anaemia, for which purpose rest periods of a fortnight every 2 months are also advisable. Crystalluria has not been observed by the authors, who are United States Public Health Service officers in control at Carville Leprosarium, and no evidence of renal damage has been observed, although a few cases of unexplained haematuria were observed in the early work with diasone when the initial dose of 1 gm. daily was being given. The drugs are all rapidly excreted in the urine.

Although results are produced slowly, objective improvement seldom appearing before treatment has been given for 6 months, these drugs have proved therapeutically more efficient than any previous treatment tried at Carville. Nearly all the cases were of the most resistant type, far advanced lepromatous leprosy. Skin and nasal smears, ordinarily rich in bacteria in lepromatous leprosy show a reversion to bacteriological negativity in ever increasing proportion of cases after a year of treatment. The authors nevertheless feel that 5 to 10 years or even longer, of careful observation will be necessary before the ultimate value of sulfone therapy can definitely be established.

Among the antibiotics streptomycin is under trial at present and appears to produce some improvement initially, but failure to continue the improvement suggests that the bacteria develop a resistance to the drug. Penicillin has not been found of use except in controlling secondary infection of lepromatous ulcerations.

D. E. H. CLEVELAND

Dermatologic Manifestations in Psychiatric Disorders.

Cornbleet, T. and Brown, M.: *J. Am. M. Ass.*, 136: 152, 1948.

It is well known and accepted that signs and symptoms in somatic organs are seen to accompany specific mental disease, such as dementia praecox. The authors in this article confine their discussion to this class of cutaneous manifestations, specifically regarding them as indexes to well known psychic disease entities. They mention as well the view that specific somatic diseases are influenced by mental states, peptic ulcer being cited as an example; also the view, much less established but most discussed at present, that repeated emotional tension states may produce certain somatic diseases such as asthma, hypertension and eczematoid dermatitis. Certain dermatologic symptoms appear only in the presence of mental disease, while others may appear in various disease entities, both physical and psychical. Itching, for instance, also paræsthesias, may arise from many causes apart from mental disorder, but the latter may be suspected when the itching is intense, abrupt or of recent onset and not explainable or accompanied by a cutaneous or other somatic disorder. Paræsthesias are more often due to psychic disease than is itching. Other symptoms associated with the skin which indicate mental disorder are excessive concern over the skin, which may be an expression of fear and the response to delusion. Such, for example, are excessive washing or cleansing, fear of contracting syphilis from familiar inert objects, interposition of paper or cloth between the skin and objects handled. A dermatitis with glove distribution often results from excessive washing, scouring with abrasives, etc. Obsession over normal or physiological states or changes, apart from that which may be rationalized on the basis of vanity, economic and similar considerations should arouse suspicion of mental disorder. The person who reacts unreasonably to actual pathologic changes in the skin, such as a resistant patch of psoriasis, facial hairs, baldness or graying hair, belongs in the same category. A group which is the antithesis of this consists of those who are inordinately indifferent to dermatologic disease which calls for serious attention. Delusions of infestation and neurotic excoriations, pulling and breaking hairs or cuticle and other self-mutilations call for psychiatric investigation, although in some of

these conditions as well as feigned eruptions, instead of mental disorder a definite motive, such as pension or workmen's compensation may be operating. Perhaps in schizophrenia and dementia praecox, more than other mental disease, the patient is apt to consult a dermatologist early. In the manic-depressive psychosis itching and paræsthesias of skin and mucosæ are frequent; excessive concern over psychologic changes, delusions about the skin or appendages are also common. In psychoneurosis, defined as a specific mental disorder induced by intolerable mental stress, cutaneous presenting symptoms are less common, and these include autonomic phenomena, sweating and flushing, paræsthesias, excessive concern over physiologic changes, and minor self-injuries, these being more frequent than itching and excessive cleansing. Personality disorders are often accompanied by severe itching and exaggerated concern over physiologic changes. Delusions about the skin do not occur, but there may be self-induced injuries and autonomic phenomena.

D. E. H. CLEVELAND

Eczema Vaccinatum: Report of Two Cases with a Review of the Literature. Riley, K. A. and Callaway, J. L.: *J. Invest. Dermatol.*, 9: 321, 1947.

Since Kaposi in 1887 described a rare vaccinia type of eruption that complicated infantile eczema there has been much confusion in the literature over proper nomenclature and the etiology of various vaccinia eruptions. The existence of three different diseases, the impossibility of distinguishing between them clinically, but only by identification of the vaccinia virus or corneal inoculation test, and the identity and possession of a common etiological agent by all 3 diseases described, has each had its supporters. The present authors, in the Duke University School of Medicine Dermatological Department, believe that there are certain differences which are sufficient for diagnosis without laboratory procedures. In eczema vaccinatum there is usually history of a vaccinia contact while in Kaposi's varicelliform eruption the contact has been with a case of herpes simplex. Clinical distinctions can usually be made, and laboratory tests also distinguish between the Kaposi's eruption caused by herpes simplex virus and the eczema vaccinatum caused by vaccinia virus. Two cases of eczema vaccinatum in children are presented. Both children having eczema since birth had been in contact with recently vaccinated siblings. Virus studies which were done, while not conclusive, were suggestive in supporting the view that vaccinia virus was the etiological agent.

D. E. H. CLEVELAND

The Inhibition of Erythema Solare in the Normal Subject with Pyribenzamine. Kurtin, A., Bierman, W. and Yontef, R.: *J. Invest. Dermatol.*, 9: 163, 1947.

The delay of the erythematous response until several hours after exposure with increasing intensity over a twenty-four hour period suggests the slow release from the cell, as a result of chemical or physical change, of a substance responsible for the inflammation. In view of recent reports attesting the value of anti-histamine agents in the treatment of "physical" allergies, their employment in erythema solare was suggested. Areas of skin were treated with pyribenzamine introduced by iontophoresis, and control areas similarly treated with tap water were exposed to ultraviolet radiation from a hot quartz lamp. Typical responses ranging in intensity from simple erythema to vesiculation attaining maximum reaction in 24 hours were obtained in the control sites, while no reaction of any type in pyribenzamine-treated areas was seen during a two weeks' observation period. It is suggested that erythema solare and the systemic symptoms following severe sunburn are dependent upon the action of histaminic substance released within the tissues, and that the cellular damage may be secondary to the same local release. Inhibition of sunburn by means of local inunction of pyribenzamine in a suitable vehicle is at present under test, and preliminary observations indicate its effectivity.

D. E. H. CLEVELAND

Psychosomatic Aspects of Allergic Disorders. Weiss, E.: *Bull. N.Y. Acad. Med.*, 23: 604, 1947.

The professor of clinical medicine at Temple University employs the term psychosomatic in the sense defined by Halliday as a method of approach to general medical problems by the simultaneous application of physiologic and psychologic techniques in study and therapy, and in a more limited sense, a disorder which can be understood only when psychologic as well as physiologic factors are considered. The scientific principles of psychopathology and psychotherapy replace what was formerly spoken of as intuition—the art of medicine—when we now practice psychosomatic medicine. The patient must be approached in respect to the *kind* of a person he is, what he has *met* through life, and what has *happened* to produce in such a person with such a history the present disorder. In allergic disease psychologic forces and somatic manifestations may have roots in the same unconscious processes which discharge partly on the psychic level and partly on the physiologic level through the autonomic nervous system. Probably rather than an organic disease producing a neurosis the organic disease has disclosed an underlying neurosis. Reasoning thus many of the psychologic disturbances accompanying allergic reactions are explained, and several cases are described *in extenso* in which the logic of this reasoning appears well demonstrated. The writer takes decided issue with several prominent dermatologists who are inclined to regard a demonstrated allergen as the sole cause, and the accompanying psychoneurosis as a result of the allergic reaction in various skin diseases. He believes that in these cases physical and psychological factors act in a complementary fashion to produce the disorder of the skin.

D. E. H. CLEVELAND

The Sunburn-Protecting Effect of Para-aminobenzoic Acid. Rothman, S. and Henningsen, A. B.: *J. Invest. Dermatol.*, 9: 307, 1947.

Para-aminobenzoic acid has an absorption band in the ultraviolet spectrum which embraces all the wave lengths between 2,900 and 3,100 Angstrom units, these being called the "sunburn rays". This substance, non-toxic, non-irritating to the skin, does not soil clothing and is readily miscible with ointment and emulsion bases. It is thus free from all the disadvantages attaching to the substances previously used with similar screening powers. Tests were made on various types of skin and using both mercury vapor quartz lamps and natural sunlight. The para-aminobenzoic acid was incorporated in a vanishing cream base in the strength of 15%. In 32 persons known to be hypersensitive to sunlight absolute protection was conferred in "field experiments" with sunlight. The results of tests with mercury vapor quartz lamps were equally good. In two instances of pathologic light-sensitivities, one of solar herpes simplex and one of discoid lupus erythematosus, complete freedom from reaction following sun exposure was obtained.

D. E. H. CLEVELAND

Streptomycin in the Therapy of Granuloma Inguinale. Kupperman, H. S., Greenblatt, R. B. and Dienst, R. B.: *J. Am. M. Ass.*, 136: 84, 1948.

Previous to the advent of the modern antibiotics the treatment of granuloma inguinale depended upon the use of various antimony compounds, together with adjuvants which included topical medication, surgery and roentgen therapy. A certain measure of success was obtained by these means but a more rapid and propitious form of therapy was sought. Penicillin and the local application of tyrothricin were found ineffectual but in contrast streptomycin has yielded the most promising response. Of a series of 48 cases treated with streptomycin 35 had been treated with antimony for periods varying from 1 month to 10 years, but in all cases Donovan bodies could still be demonstrated. The dosage of streptomycin ranged from 3.3 to 60 gm. with an average of 20 gm. It was given in amounts varying from 0.3 to 4 gm. per

day in divided doses every 4 hours for a period ranging from 5 to 62 days. The drug was dissolved in sterile distilled water containing 25 to 30% of 1% procain. With increased experience the plan decided upon in later cases was 4 gm. of streptomycin per day for 5 days. Toxic reactions were infrequent, occurring in only 4 cases which had pruritus, one of whom had dermatitis as well. The 3 cases with pruritus only responded rapidly to diphenylhydramin hydrochloride, permitting continuation of streptomycin therapy. In the fourth case with dermatitis as well response to diphenylhydramine hydrochloride was unsatisfactory and streptomycin was discontinued. No eighth nerve involvement was observed. Smears negative for Donovan bodies were obtained within 2 to 11 days, clinical improvement appearing more slowly. Patients treated for 5 days with 4 gm. daily still showed granulomatous lesions when streptomycin was discontinued but nevertheless progressed to healing 8 to 12 days later. Three patients had recurrences; 2 of them had received less than 4 gm. and one had received a total dose of 28 gm. Healing occurred in all cases, although one case which relapsed apparently had developed refractoriness to the drug.

D. E. H. CLEVELAND

Industrial Medicine

Hobbies Can Be Hazardous. Hama, G. M.: *Pub. Health Nursing*, 39: 620, 1947.

In this article the author draws attention to the health hazards which can result from certain home hobbies. He recommends an investigation whenever a hobby entails exposure to dusts, fumes, vapours or gases, in order to determine the presence of any toxic or irritating materials. He stresses the importance of seeking advice from the local Bureau of Industrial Hygiene, either to determine the toxicity of an unknown material, or in cases where dangerous materials must be used, to suggest adequate control measures. Details are given of trouble experienced by two nurses who found the designing and manufacturing of costume jewelry such a relaxing and profitable hobby that they frequently spent an entire day at the work bench. When one experienced soreness around her gums and her dentist was unable to account for it, she decided to ask the Bureau of Industrial Hygiene to investigate the hobby. An inspection revealed that certain of the materials involved in the process were irritating or toxic and known to produce the symptoms complained of. Reference is made also to other dangerous home hobbies as: refinishing of antique furniture involving the use of paint and varnish removers which generally contain large quantities of benzene; removing wax finishes from furniture and floors by use of carbon tetrachloride; and pottery making, where the sprayed material contains a lead compound.

MARGARET H. WILTON

On the Apparent Increase in the Incidence of Lung Cancer in Denmark, 1931-1945. Clemmesen, J. and Busk, T.: *Brit. J. Cancer*, 1: 253, 1947.

Increase of the recorded mortality from lung cancer has been reported in literature for some years. More recently attention has been drawn to the apparent rise in lung cancer among males. Mortality figures from official sources in several different countries have confirmed that view. The authors of this article present the situation in Denmark as indicated by statistics from case records. On the basis of death certificates from the years 1931 to 1945, the crude mortality rate from lung cancer worked out and computed per 100,000 living males and females in Denmark, and separately for the capital, provincial towns and rural areas. Analysis of the findings show a steep increase of mortality from lung cancer within a limited area, far more pronounced for males than for females. Since 1931 the cases increased from about 5 per 100,000 in the capital to about 25 per 100,000 living in 1945, while the corresponding figures for

females were respectively 4 and 7 per 100,000. In that period the sex ratio changed from about 5:4 to about 3:1.

To check the reliability of these statistics, further investigation was carried out with regard to the incidence of lung cancer. Examination was made of case records on lung cancer, among patients examined in the Central Tuberculosis Station of the City of Copenhagen, from 1936 to 1945, and the incidence was computed for persons more than 45 years of age. The analysis shows a slight increase in the frequency; for cases more than 45 years of age the sex ratio has been 8 men to 1 woman. The authors stress the fact that no increase of the incidence of lung cancer corresponding in gravity to the tripling of the mortality rates for males in the capital from 1936 to 1945 was found among the patients of the central tuberculosis station. The best technique available is employed in the examinations conducted at this station and this improvement in diagnostic procedure may account for the slight apparent increase in incidence.

MARGARET H. WILTON

OBITUARIES

Dr. William Glaister

[A notice of Dr. Glaister's death appeared last month. The following appreciation has been sent us by Dr. P. L. Tye of Milverton.]

Dr. Glaister was a typical country doctor, one of the most successful and one of the best. He could have gained fame in the larger centres but preferred to remain among the people he knew. Going through the horse and buggy days on roads that were at times impassable made him resort to snowshoes. No weather was too bad for him to reach the bedside of the needy and poor as well as those in better circumstances. He was a good surgeon and for many years did all his surgery in the homes where he had wonderful results. As a diagnostician he was one of the best and his advice was sought by many far and wide. Dr. Glaister was a wonderful student and always kept abreast of the times. Every spare minute he spent with his beloved books. He did not have much time for sport but in his younger days he enjoyed bowling, tennis, hunting and fishing.

The passing of Dr. Glaister has left a great sense of loss in his home community. His quiet, assured manner brought comfort and confidence in the sick room. He was beloved by all and his memory will long remain in the hearts of the people of Wellesley and district.

P. L. TYE

Dr. J. H. Allen, formerly of Yellow Grass, Sask., died recently at his home in Vancouver. He was a real pioneer, coming to Yellow Grass with Mrs. Allen in 1905. He served the district for 35 years, retiring in 1940, when he moved and made his home in Vancouver. He is survived by his widow.

Dr. P. A. Brassard, aged 83, died on March 12 in Princeville, Que., where he practised medicine for almost 60 years. Well known throughout the Eastern Counties, he was known as the "doctor of the poor". He graduated in medicine from Laval University in 1889. Four daughters survive.

Dr. J. Herbert Ferguson died in St. Thomas, Ont., on March 16, aged 76. A former Springfield medical practitioner and a gold medalist of the University of Toronto Medical School. Dr. Ferguson was born in Aylmer. He later lived in Sparta for some years and in St. Thomas and for some 20 years practised his profession in Springfield.

Dr. Louis Philippe Gauthier, of Ottawa, died on July 7, 1946. He graduated in Medicine from Laval University in 1919.

Dr. Frederick S. Hutchinson, former sheriff and registrar for Peel County, died at his home in Brampton, Ont., on February 18. He is survived by his widow.

Dr. Margaret Macallum Johnston, of Toronto, died on December 12. She graduated in Medicine from Trinity in 1900.

Dr. Thomas McCrae Leask died suddenly on March 7, 1948. He was 72 years old. He was born in St. Helens, Ontario, on March 16, 1875. Educated at Parkdale Collegiate in Toronto, he graduated from the University of Toronto Medical School in 1899. He interned at St. Michael's Hospital, Toronto, for a year and then served as a medical officer for a railway company in Northern Ontario until 1902. In 1903 he moved to Moose Jaw, Saskatchewan, where he made his home until his death. Dr. Leask established one of the first medical clinics in Saskatchewan and was early associated in partnership with Dr. Vaughn E. Black and Dr. R. Bruce Burwell who predeceased him. During the First Great War, he served overseas with the 10th Field Ambulance, a unit which he commanded with great distinction in the rank of Lieutenant-Colonel. He won the Distinguished Service Order and Bar and was twice mentioned in despatches for service in the active theatres of war. In 1919 he returned to Moose Jaw where, after a post-graduate course in Surgery in Chicago, he resumed his practice.

Dr. Leask took an active interest in community affairs during his lifetime. He was a member of the Moose Jaw Kiwanis Club and was a Freemason, being a member of Moose Jaw Lodge No. 3 A.F. & A.M. He served for some time as member of the board of managers of St. Andrew's Church. He was a past president of the Moose Jaw Military Institute and a past district commissioner of the Moose Jaw and District Boy Scouts' Association.

He is survived by two daughters and a son.

AN APPRECIATION

With the passing of Thomas McCrae Leask, Saskatchewan lost one of her pioneers, Moose Jaw her eldest and highly respected surgeon, and the Moose Jaw Clinic its inspiration and beloved chief.

For forty-two of his nearly fifty years of medical practice he served well the community of Moose Jaw and South Western Saskatchewan. During his life in the West he saw Saskatchewan born and his home town develop from a rough frontier post to a vigorous modern city. His organizing ability and rare professional gifts were responsible for building a successful medical group practice which withstood the trials of two wars and the severe drought and financial depression of the Thirties.

He took a keen interest in his post of Chief Medical Officer of the Canadian Pacific Railway, Saskatchewan Division, and in the course of his duties became widely known and respected by his professional colleagues throughout the West.

Very close to his heart was his love of King and Country. An ardent Imperialist in the best sense of the word, he was ever ready to take up cudgels for the British Empire and her institutions. His Great War record was a most distinguished one and the comradeship he received and the affection he felt for his men of the 10th Field Ambulance continued throughout the years. One of the highlights of each year's experience would be his annual trip to Winnipeg for a reunion with those of the Tenth Field who were still able to attend. During World War II he saw his medical clinic staff reduced to 50% of its strength and during this period he carried a tremendous burden with long hours and great responsibilities, when he should have been able to take life easy. Dr. Leask never spared himself and his life was devoted to his profession. A man of uncompromising ideals and strong loyalties, to hundreds he had not only been physician, but confidant, friend and benefactor. For his family and professional associates his loss has been a grievous one. His contribution is

impossible to measure. He set a standard of service that will ever remain as a challenge to those who were privileged to work with him and who follow in his place.

Dr. Edward H. Robinson, aged 81, died suddenly in Florida on March 8. He practised medicine in Toronto some years ago, then went to Paris, France, to continue his work, and when the First World War broke out, joined the British Army medical corps and served in France. He is survived by his widow, one daughter and one son.

Dr. Claude Maurice Stafford, aged 66, Riverside, and and public health surgeon with the United States Consulate in Windsor, died March 10. Dr. Stafford was born in Essex in 1881. From 1911 to 1912 he was acting health officer in Saskatoon and in World War I, he served in the Canadian Army Medical Corps as a captain. He was a Fellow of the American College of Surgeons and a member of the College of Physicians and Surgeons of Ontario and a member of the Phi Beta Pi medical fraternity. An active churchman, Dr. Stafford and his wife were the first members and founders of Grace Episcopal Church, Detroit. He is survived by his widow, a daughter and three sons.

Dr Louis Verschelden, après plusieurs mois de maladie est décédé le 18 mars à Montréal. Il était âgé de 67 ans.

Né à Ste-Thérèse de Blainville, il avait fait ses études classiques au Petit Séminaire de Ste-Thérèse et ses études médicales à l'Université Laval de Montréal où il avait gradué en 1906. Il était chef de service à l'hôpital du Sacré-Cœur de Cartierville et professeur agrégé à la chaire de phthisiologie de l'Université de Montréal. Le Docteur Verschelden avait également été pendant plusieurs années l'une des personnalités les plus remarquées de notre monde musical. Musicien éprouvé et doué d'une belle voix de baryton, il avait été maître de chapelle du S.-Enfant Jésus, de 1902 à 1944. Il avait pris part à plusieurs concerts tant à Montréal qu'à l'étranger surtout avec l'Association des Chanteurs de Montréal, et avec l'Orphéon de Montréal dont il était le président.

Il laisse 6 fils et 6 filles.

Dr. George Forrest Weatherhead died on March 5 in Winnipeg. Born in Brockville, Ontario, 74 years ago, Dr. Weatherhead graduated in medicine from Queen's University in 1902. He came to Winnipeg in 1907 and practised here and at Winkler, Manitoba. In World War I he served overseas with the C.A.M.C. and returned to Webb, Saskatchewan. He acted as medical superintendent of the Ile à la Crosse Hospital until 1934 when he retired on account of illness. In his younger days he was an excellent tennis player and was champion of Manitoba. He is survived by his widow, three sons and four daughters.

NEWS ITEMS

Alberta

An Act to incorporate "Medical Services (Alberta) Incorporated" was approved at the 1948 session of the Alberta Legislature. The corporation will have power to furnish prepaid medical, surgical and obstetrical care to groups, families and individuals. The corporation will be administered by a Board of Directors representing those receiving, and those giving the service. The following will act as the first Board of Directors: Mr. C. D. Jacox, President, Great West Garment Ltd., Edmonton; Dr. A. E. Archer, Lamont; Dr. R. L. Anderson, Tegler Building, Edmonton; Mr. J. M. Wheatley, Chancellor, Alberta.

The fifth member of the Provisional Board, Mr. Ray E. Staples of Edmonton, died during the passage of the Bill. The death of Mr. Staples will be a great loss to the corporation. It is hoped that the corporation will be able to commence providing service by early summer. The initial membership will be limited to groups.

At the 1948 session of the Alberta Legislature the Associated Hospitals of Alberta incorporated, and with the incorporation obtained power to provide for hospitalization on a prepayment basis and for the sole right in the Province of Alberta to the use of the words "Blue Cross Plan". The Blue Cross Plan will be administered by a board of nine representing various groups of hospitals, the subscribers, municipalities and the College of Physicians and Surgeons.

The following have registered with the College of Physicians and Surgeons, Province of Alberta, since the first of the year: Eli Abramson; Leslie Christie Allan; Donald Park Beckett; Harvey Hugh deBurgh Black; Thomas Michael Brown; James Harold Herbert Chataway; William LeGrande Cooper; John David Duffin; Donald Armstrong Gibson; Ronald Meredith Jackson; Leon Komar; Alexander Gray McLaren; Brendan Joseph O'Sullivan; Stephen Benedict Thorson; Roland Watson; Nicholas Frederick Wishlow.

Dr. Gordon Ellis, President-Elect, Canadian Medical Association, Alberta Division, will visit the various District Medical Societies during the first week in June. Dr. Ellis will be accompanied by Dr. W. S. Anderson and Dr. D. R. Wilson. These doctors will address the meetings on scientific subjects. A representative of the College of Physicians and Surgeons will also accompany Dr. Ellis and will discuss economic matters.

W. C. WHITESIDE

British Columbia

The most important step that has yet been taken in British Columbia, and in some ways in Canada, towards a complete and adequate system of general medical care for the whole population, is the recent announcement by Premier Byron Johnston that his government proposes to introduce a compulsory hospitalization plan in the near future, to include everyone in the Province. This has been in contemplation for some time, but until the Premier's announcement, nothing was known of what form the plan would take, how complete it would be, or just how the prevailing bed shortage would be met.

Premier Johnston and members of his cabinet met the representatives of the British Columbia Medical Association, as well as those of various Hospital organizations, of the Blue Cross Association, of the Medical Services Association and other bodies interested in the matter. While the scheme has not yet been submitted to the Legislature, and so is still open to discussion and modification, the published statements of the Premier seem to show that he has in mind a really thorough and adequate plan, which will assure first-class hospital service to the citizenry of the Province. The sum assessed against each citizen and family seems to be adequate, and such organizations as the Blue Cross, which is the model on which the proposed scheme is based, will still operate. The Government has denied any intention to build hospitals, but the latest news from Victoria is that a fund will be set up from which existing hospital organizations will be able to borrow for building and expansion purposes. There seems to be a feeling throughout the Province, and in the minds of hospital executives, that this is a very sound and statesmanlike move on the part of our new Premier.

The British Columbia Cancer Foundation opened its new building on March 31. This building is thoroughly modern, and is adjacent to the older buildings on Heather Street and Eleventh Avenue. For a long time the

Institute has been greatly hampered by lack of space, and the fact that it had to depend entirely on the greatly over-crowded operating rooms of the Vancouver General Hospital for its work in application of radium, etc. Now it will have far better facilities, and in the words of its Board of Directors, "The Building and Equipment, financed by public subscription, provides facilities for the treatment of Cancer unexcelled in Canada". A large and representative group of those concerned in Public Health, medical practice, and particularly the treatment of cancer, attended the opening, and were greatly impressed with their visit.

The first Annual Meeting of the British Columbia Surgical Association, held last month, under the Presidency of Dr. L. H. Appleby, was a thoroughly notable one. The sessions were thrown open to the general profession, on payment of a very small fee, and were uniformly excellent.

To a great many of the medical men of Vancouver, and indeed of British Columbia, the announcement of the recent death of Dr. T. D. Ponton, formerly of the Staff of the American College of Surgeons, will come as a shock. Dr. Ponton at one time filled the position of Assistant Medical Superintendent of the Vancouver General Hospital, and was Acting Medical Superintendent for a short time, in an interval between the retirement of Dr. MacEachern and the appointment of Dr. Haywood. He was much liked and was always a hard worker and a good friend to the medical practitioner.

In these days of astronomical deficits in hospital administration, it comes as a pleasant surprise when a hospital in active operation announces that it has made a profit. This is the case, we are told, with the Matsqui-Sumas-Abbotsford General Hospital of the Fraser Valley. The chairman of the society, Mrs. M. Shore, in her annual report, stated that there had been a net balance over expenditures for the year, of \$5,700. This reflects well on the management of this very busy hospital.

Miss E. M. Kathleen Panton, matron of Shaughnessy Hospital Vancouver, has decided to retire from her post shortly. Miss Panton has been on the Shaughnessy Hospital Staff for thirteen years, six of which she spent as Matron. Her career as a nurse is a long and distinguished one—she was in the First World War as a nursing sister, served in France and England, was awarded the Royal Red Cross while serving with No. 1 Canadian Casualty Clearing Station, and was later mentioned in dispatches. A gallant and thoroughly useful career.

Dr. L. H. Appleby, senior surgeon on the Medical Staff of St. Paul's Hospital, has been accorded the considerable honour of being asked to read a paper on gastric surgery at the forthcoming International Assembly of the International College of Surgeons, to be held in Rome from May 18 to 23 of this year. He will also address the Assembly in its meeting at Turin, and will later be going to England to deliver an address before the Royal College of Surgeons, of which he is a Fellow. Dr. Appleby is also a Regent for Canada of the International College of Surgeons, and a Member of their Board of Trustees. J. H. MACDERMOT

Manitoba

Dr. Gordon Chown, Dr. James McGillivray and Dr. O. J. Day were honoured on their retirement from the active staff of the Children's Hospital by the Board of Directors and medical staff of the hospital at a dinner in the Fort Garry Hotel. Honorary life memberships in the hospital were conferred on the three doctors by the president of the Board.

Free streptomycin treatment of advanced types of tuberculosis has been approved by the Winnipeg health committee on recommendation of Dr. M. S.

Lougheed, medical health officer, and \$5,000 has been voted for the purpose. It is expected that twenty persons per year may require streptomycin treatment.

Dr. W. H. Patterson and Mrs. Patterson were honoured on March 19 at a gathering in the Community Hall of Holland, Man. Dr. Patterson practised for over nineteen years at Holland and has served on the school board, the church board and has been Chairman of the Red Cross. They will reside in Chilliwack, B.C. Dr. Patterson will join the staff of Coqueleetza Indian Sanatorium at Sardis, B.C.

Dr. Blake Watson, formerly of Winnipeg, now of Los Angeles, was a welcome visitor at the Winnipeg General Hospital on March 22.

The Abbott Clinic has moved to new quarters on the southwest corner of Memorial Boulevard and St. Mary's Avenue, Winnipeg.

Manitoba was again in the news with a dramatic mercy flight. Pilot Bob Race has completed a flight to a point 800 miles within the Arctic circle and has brought out to Winnipeg the wife of a meteorological observer who was seriously ill.

There have been several changes of location lately. Dr. W. H. C. North is now practising at Carman. Dr. D. M. Thomson of Winnipeg has moved to Ottawa. Dr. Charles E. Acheson has gone to Gladstone, Man. Dr. Stuart MacKinnon, formerly at Vita, has joined his brother, Dr. A. H. MacKinnon at Gladstone. Dr. E. A. Jones, Jr., lately with D.V.A. at Deer Lodge Hospital, has joined the staff of the Lake Region Clinic at Devil's Lake, North Dakota. Dr. C. V. McClelland, formerly of Dominion City is now at Pilot Mound, Man.

On March 10 a number of his friends, past and present directors of Manitoba Medical Service met at dinner in Manitoba Club, Winnipeg, to do honour to Dr. E. S. Moorhead. The occasion was his retirement as medical director of Manitoba Medical Service. His successor, Dr. John M. MacMaster, Glasgow '29, was introduced to those present. Many tributes were paid to Dr. Moorhead for his arduous work and he replied with the felicity of a Trinity College, Dublin, graduate.

Dr. Stuart Musgrove has returned to Winnipeg from postgraduate work in London, England.

Dr. Roper Cadham has resigned his position as head of the Provincial Laboratory and will become Assistant Health Officer of the city of Winnipeg.

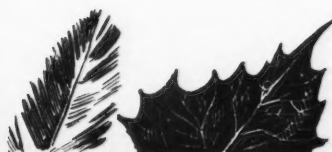
Dr. E. P. McCullagh, a Manitoba graduate, now of the Department of Endocrinology, Cleveland Clinic, Cleveland, Ohio, addressed the Winnipeg Medical Society on March 12, on the subject of "Climacteric—Male and Female". ROSS MITCHELL

New Brunswick

Dr. L. M. Veniot, of Bathurst, flew from Bathurst to Miscou Island, on March 1, to attend a case of difficult labour complicated by hæmorrhage. The delivery successfully completed Dr. Veniot returned by plane the following morning. Dr. Veniot had high praise for the nurses at the Red Cross Outpost hospital on Miscou, who called for aid in this emergency.

Dr. K. A. Baird of West Saint John, attended the meeting of the American College of Allergists in New York.

Dr. Ian A. MacLennan, Pathologist, at Moncton City Hospital, is at Cornell Medical College, taking the special course on the "Papanicolaou Cancer Smear Technique".



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on a scholarship provided by the New Brunswick Branch of the Canadian Cancer Society.

Dr. R. A. H. MacKeen, Director of Laboratories of the New Brunswick Department of Health is attending the course in "Papanicolaou Cancer Technique" at Cornell. Dr. MacKeen represents the Department of Health at this school as one of the Provincial Consultants of the Cancer Diagnostic Clinics.

Dr. John R. Nugent of Saint John, is spending a fortnight at the New York Cancer Memorial Hospital, with Dr. Geo. T. Pack, the director of treatment in that Hospital. While in New York, Dr. Nugent will study advanced methods of treatment of Cancer and will arrange if possible for a number of New Brunswick Physicians of the Cancer Services to attend short courses at the Memorial Hospital. He is also authorized to arrange courses in Boston Hospital.

Dr. W. D. Miller, of the staff of the Saint John General Hospital has discontinued his practice to take further surgical training at the Royal Victoria Hospital, Montreal.

Dr. E. A. Petrie, Radiologist, at St. Joseph's Hospital, Saint John has returned from Chicago, where he attended special courses in Radiology.

Dr. E. A. Stewart, who has practised for some years in Ontario, has begun a practice in Saint Andrews, N. B.

The Cancer Diagnostic Clinic at Fredericton will be directed by Dr. G. E. Chalmers, with Dr. A. F. Van Wart as alternate.

Dr. Gavin Miller, of Montreal, discussed "Large Bowel Surgery" at the March meeting of the Saint John Medical Society. The attendance at these meetings is growing and the March meeting made a new record. Dr. Miller's paper was most practical and delightfully free of statistics, but full of sound advice both on diagnosis and treatment of surgical conditions of the colon. Dr. Miller's Maritime friends are very pleased that he has established a foothold in beautiful St. Andrews-by-the-Sea.

A. S. KIRKLAND

Ontario

Today, March 23, the Ontario Medical Association has gone over the 3,500 mark of paid members—the highest in its history.

The Lennox and Addington Medical Society has recently been reorganized with Dr. T. M. Galbraith as President and Dr. W. E. Burns as Secretary.

Lincoln County Medical Society has planned an outstanding program of spring scientific meetings. Their plans encompass the presentation of scientific papers by Dr. J. V. Meigs of Boston, Dr. Howard F. Root of Boston, Dr. W. F. Connell of Kingston, Dr. R. Champ Lyons of New Orleans, Dr. Frank Lahel of Boston, and Dr. Sara Jordan of Boston. The attendances at the scientific meetings are more than doubled due to the outstanding scientific program planned.

The Section of Anaesthesia of the Ontario Medical Association held a scientific session on March 24 in conjunction with the University of Western Ontario, London. The program presented interesting topics to the practitioners in that area. This program was under the supervision of the Section of Anaesthesia of the London Academy of Medicine which has recently been formed with Dr. J. A. Blezard as Chairman.

Physicians' Services Incorporated, the new prepaid medical care plan in Ontario, has been enrolling subscribers and will make a report to the Council of the

Ontario Medical Association at its meeting on May 10 and 11. Physicians' Services Incorporated is also planning to hold its annual meeting on May 11.

M. H. V. CAMERON

Dr. A. G. Gornall, Department of Pathological Chemistry, University of Toronto, recently gave a paper on "Aspects of the Intermediary Aspects of Protein" at the Physiological Society.

Dr. Gordon P. Jackson, Toronto's M.O.H., prefers education of restaurant proprietors and their employees rather than compulsory physical examinations. The City Health Department had proposed to open a centre with four doctors, a nurse, and clerk to look after examinations of food handlers but this idea has been dropped. City Council noted that after eleven years of compulsory examinations New York City has discontinued them. To definitely certify that a food handler is free from communicable disease at least a chest x-ray, a Wassermann and a stool examination for typhoid, paratyphoid and amebic and bacillary dysentery had to be made. Even with such a complete examination there was no assurance that a food handler would remain free of communicable disease during the tenure of his certificate. The New York Department of Health feels that too much emphasis has been laid on the spread of disease by food handling when it is known to be spread in other ways. This refers to venereal disease, tuberculosis and skin conditions.

LILLIAN A. CHASE

Quebec

Le Dr Jean Paul Legault, chef-adjoint du service d'urologie de l'Hôtel-Dieu a été nommé, après concours, professeur agrégé en urologie. Le Dr. Paul Letendre a été nommé assistant régulier à titre d'enseignement à la chaire de clinique médicale du même hôpital.

L'Université de Montréal décernait récemment le titre de docteur en médecine "honoris causa" au Dr B. A. Houssay.

Le gouvernement brésilien a invité le Dr A. Cantero à entreprendre une mission scientifique au Brésil.

Le Dr Louis Ivan Vallé vient d'être nommé chef du service de radiologie de l'hôpital St-Luc de Montréal.

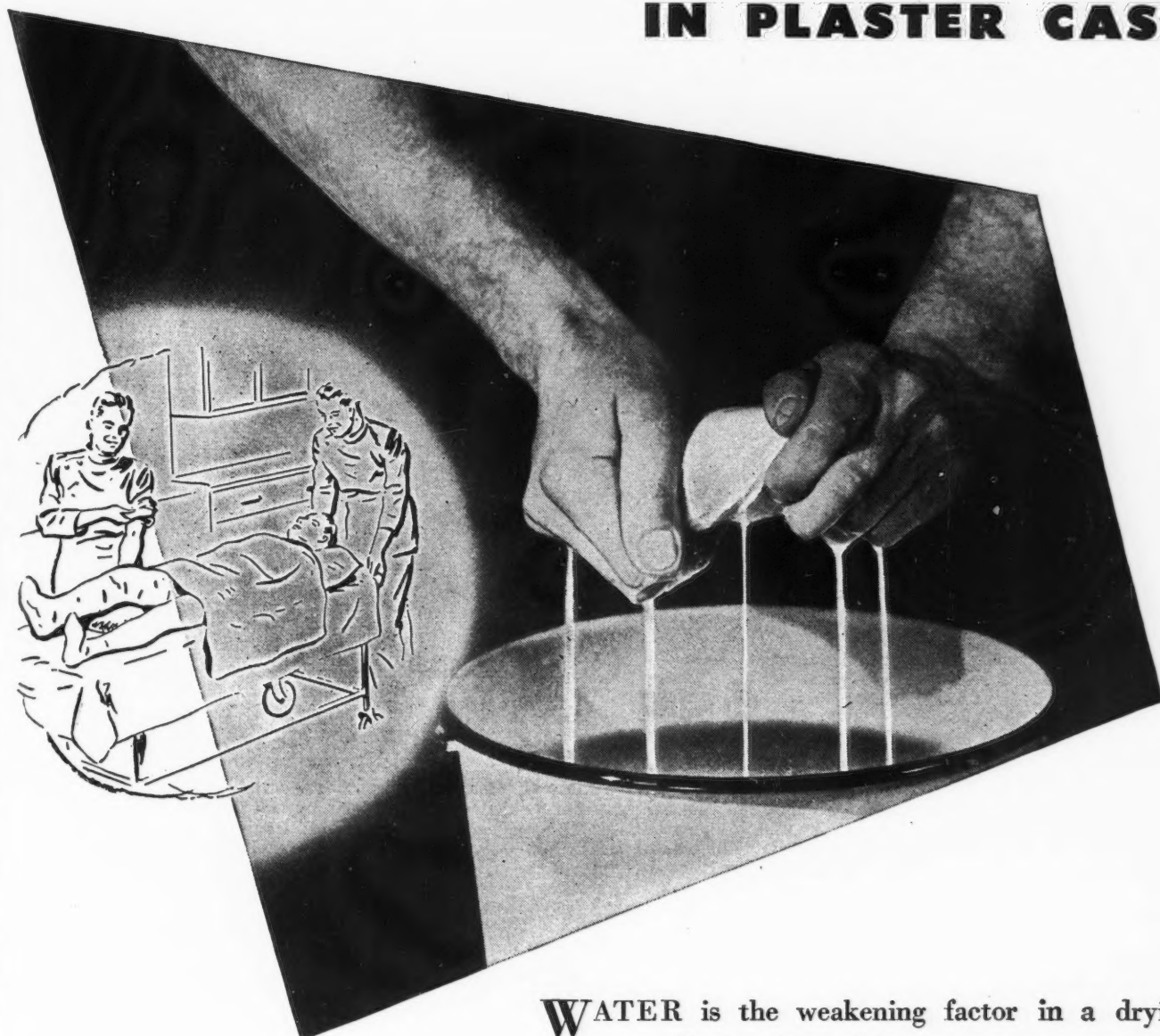
Le Dr Jean Saucier a été nommé professeur titulaire de neurologie à la faculté de médecine de l'Université de Montréal.

JEAN SAUCIER

The annual meeting of the Montreal Medico-Chirurgical Society will be held in the Ritz Carlton Hotel Ballroom on May 14. This will be in the form of a dinner at which Dr. Shields Warren, pathologist, New England Deaconess Hospital, Boston, will speak on "The Uses of Atomic Energy in War and Peace".

The Institute for Special Research and Cell Metabolism of the Montreal General Hospital was formally opened on April 7, and a large number of the friends and officials of the Hospital were present. The Institute occupies one of the former private residences on Upper University Street in Montreal which has been completely remodelled for its special purpose. It is composed of carefully planned and organized divisions which will deal with atomic chemistry, analytical chemistry and enzymes. These will take up various problems in disease, and the work of the Institute will of course be closely co-ordinated with that of its parent Hospital. This development is really an extension of the work of the Montreal General Hospital in accordance with its aims laid down in its original charter granted 125 years ago. The Director of the Institute will be Dr. I. M. Rabinowitch

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formerly in charge of the Department of Metabolism of the Hospital, and the Associate Director will be Dr. J. H. Quastel, F.R.S., one of the leading authorities on enzymes in the world.

General

The American Congress of Physical Medicine will hold its 26th annual scientific and clinical session September 7 to 11 inclusive, at the Hotel Statler, Washington, D.C. All sessions will be open to members of the medical profession in good standing with the American Medical Association. In addition to the scientific sessions, the annual instruction courses will be held September 7, 8, 9 and 10. Full information may be obtained by writing to the American Congress of Physical Medicine, 30 North Michigan Avenue, Chicago 2, Illinois.

Dr. K. C. Charron, a graduate of the University of Toronto, and for 10 years a specialist in industrial medicine in Tanganyika in East Africa, has recently been appointed to the industrial health division of the Department of National Health and Welfare. This division co-operates with the provincial health departments and through them with management and labour in developing standards of healthful working conditions in factories and shops and in promoting the extension of medical services to industrial workers.

Artists, Beware!—If you plan to exhibit at the Chicago Exhibition (American Medical Association, June 21 to 25, 1948)—NOW is the time to write for entry blanks, rules, shipping labels, etc. Haste is necessary because your entries must reach Chicago between May 1 and June 12. For details, please write airmail to Francis H. Redewill, M.D., Secretary, American Physicians' Art Association, Flood Building, San Francisco, California.

The Christian Medical Society is sponsoring its annual convention in Chicago, June 25, 26. The program will be held at the Illini Building, 715 South Wood Street. The Society is an organization of physicians and medical students who purpose to meet together and to present a positive witness to Jesus Christ. They are devoted to the Biblical concept of Christianity, and as such recognize no denominational barriers.

The First Annual Elmer Hess Prize was awarded last year by the Western New York and Ontario Urological Society to Dr. R. R. Francis of the Toronto Western Hospital. The prize winning paper was entitled "The Effect of Carbachol and of Meeholyl on the Urinary Bladder".

This prize is to be awarded annually and includes \$25 plus the winner's own personal hotel expense while attending the meeting at which the prize paper will be read. Eligible are residents or interns in urology, or urologists with not more than two years' practice, residing within the Society's area. The paper may be on any subject, clinical or basic, related to urology, and shall be limited to ten triple spaced pages. Preference will be given to original work. Three copies of the paper should be mailed to Dr. N. W. Roome, 170 St. George St., Toronto 5, before June 1, 1948.

The regular annual meeting of the Royal Edward Laurentian Hospital was held in Montreal on March 30, under the chairmanship of Mr. Howard Murray. All the reports stressed the rising cost of hospital service due to increased prices and wages, as well as the need for further expansion of such service, which could be secured only by additional contributions from private

benefactors and also, if possible, by additional direct or indirect contributions from Provincial government.

Prime necessity for the hospital, Mr. Murray stated, was an expansion in its bed capacity. Two hundred beds could be added at Ste. Agathe and 200 more at Montreal. Without this expansion the hospital could not adequately deal with the people already on its case record, who were of all nationalities and religions.

The hospital reported a deficit of \$80,421, the largest in its history. The average daily cost of maintenance of patients was \$3 but the average daily revenue was only \$2.32. Reports by the directors of the two divisions were unanimous in describing steadily increasing volume of work with insufficient accommodation and shortage of staff. The work of the physicians and nurses was in the highest degree admirable.

Awards by the Life Insurance Medical Research Fund.—The Life Insurance Medical Research Fund announces the award of 43 grants in aid of research in the field of cardiovascular disease and fourteen postgraduate fellowships for research. The total sum granted for research programs is \$484,790. The amount awarded with fellowships is \$52,600. Postgraduate fellowship stipends vary from \$2,500 to \$4,000. These awards bring the total sum made available for aid to medical research by the Life Insurance Medical Research Fund since its organization in December, 1945, to approximately \$1,800,000. Postgraduate research fellowships have been granted to Claude Fortier of Montreal, and John R. Polley, Ph.D., of Toronto. A grant has been made to McGill University for research by Professor Hebbel E. Hoff.

BOOK REVIEWS

American Medical Research Past and Present. R. H. Shryock, Professor of History and Lecturer in Medical History, University of Pennsylvania; acting director, American Council of Learned Societies. 350 pp. \$2.50. The Commonwealth Fund, New York, 1947.

This historical account of the growth of medical research in the United States of America is one of a series of monograph studies sponsored by the Committee on Medicine and the Changing Order of the New York Academy of Medicine. The series is intended to provide a better understanding of the current position of medical education, medical research and medical services through analysis of their historical development. This volume deals primarily with research, but it also contains much material concerning other fields of activity, where these influenced, either favourably or adversely, the evolution of investigative work in North America. The time covered extends from the mid-eighteenth century to the present day, and includes four main periods, 1750 to 1820 when British influence was predominant, 1820 to 1860 when French leadership was accepted, 1860 to 1895 when German workers provided the chief inspiration, and 1895 to the present during which time medical research in the United States of America attained independent status. The author discusses in detail the rôles played in the financial support of research by individual benefactors, foundations, research institutes, lay and medical societies, universities, hospitals, corporations and governmental agencies. Throughout the text, he traces the influence of changing public opinion on the development of research. In a brief final chapter, a glimpse into the future is attempted. This book is by no means of the nature of "light reading". Its contents must be carefully studied to be grasped. It will be of value to all who are genuinely interested in a scholarly approach to the con-



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1. Gold, H., McK. Cattell, W. Modell, N. T. Kwit, M. L. Kramer and W. Zahm, Clinical studies on digitoxin, with further observations on its use in the single average full dose method of digitalization, *J. Pharmacol. & Exper. Therap.* 82:137-195 (Oct.) 1944.

2. Gold, H., The choice of digitalis preparations, *Connecticut State M. J.* 9:193-196 (March) 1945.

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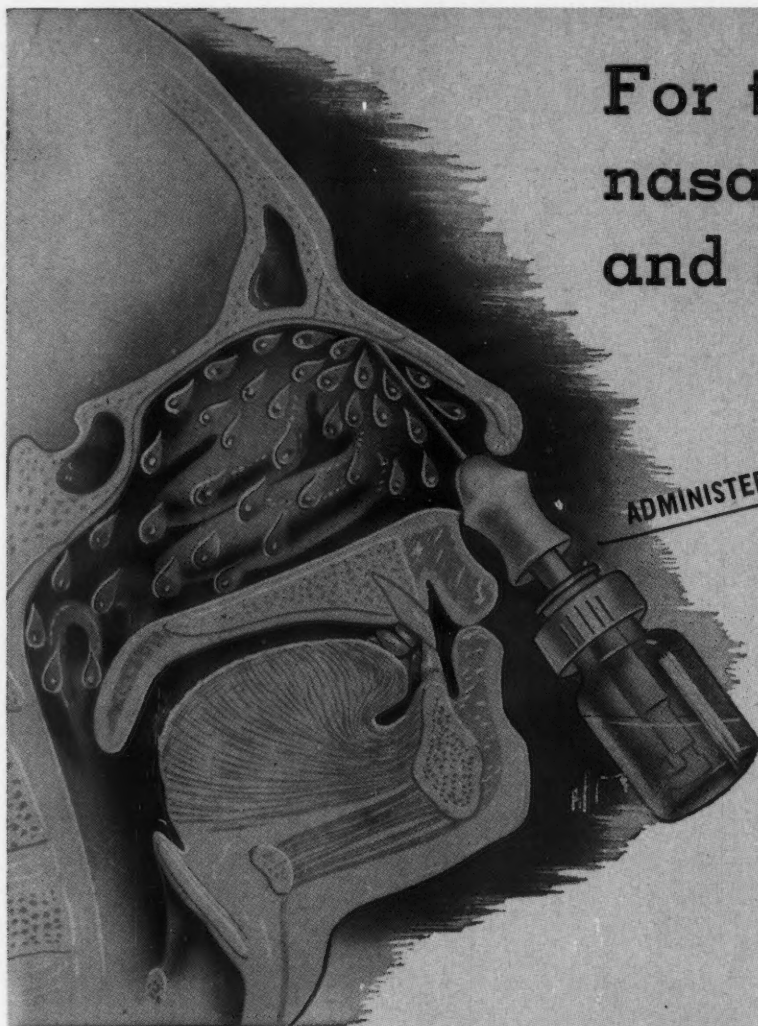
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LITERATURE AND SAMPLES ON REQUEST.



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temporary problems of medicine, and their relation to many of the other facets of the North American way of life.

Early Medicine in Alberta. H. C. Jamieson, Professor of the History of Medicine, University of Alberta, Edmonton. 214 pp., illust. Published by the Alberta Division of the Canadian Medical Association; The Douglas Printing Company, Ltd., Edmonton, 1947.

Dr. Jamieson has done a piece of hard work and has done it well. A connected history of early medicine anywhere is very difficult and in a Province like Alberta with its spaces and rapid growth is hardly practicable. Dr. Jamieson has brought together many details of the pioneers in medicine in Alberta, and it is very doubtful if his outline will ever be filled out much more completely. The verbal sketches of the original medical men are excellent, and the descriptions of experiences in country practice are fresh and well chosen. The book is a valuable addition to Canadian medical records.

Eleven Men and a Scalpel. Lieut.-Col. J. B. Hillsman, No. 8 Canadian Field Unit. Privately circulated. The Winnipeg Clinic, Winnipeg.

The war has produced such a spate of its own literature that one may be pardoned for looking without much enthusiasm on further additions. But Dr. Hillsman has that most excellent gift of freshness which is as unmistakable as it is indefinable. The brutality, the inexorable waste, the elemental harshness of war are brought before us in all their grisly repellence. But they are only the frame for a picture of men bonded together by the most compelling urgency that men can know, and exhibiting all the strength and weakness of men. How easy it would have been to make the frame too ornate! How much the picture would have been blurred by sentimentality! How fortunate that the lighting with humour never fails!

"One may not like war books; which is understandable. But it is hard to pass casually over this one. Its simplicity, its clearcut narrative, its very humanness give it also a value which the historian of the medical aspects of the war should very gladly acknowledge.

Handbook for Dissectors. J. C. B. Grant, Professor of Anatomy, University of Toronto, and H. A. Cates, Associate Professor of Anatomy, University of Toronto. 390 pp., illust., 2nd ed. \$2.90. The Williams & Wilkins Company, Baltimore; University of Toronto Press, Toronto, 1948.

The second edition of this dissecting handbook is a considerable improvement over the first for it now stands in its own right. While it is designed to facilitate the orderly display of structures when used in conjunction with Dr. Grant's textbook it can serve equally well with any other reference text. In this edition a successful attempt has been made to provide sufficient instruction so that the manual may be used by itself in the dissecting room without necessitating constant recourse to the larger books while the work is in progress. This guide is clearly written and should prove useful in the teaching of anatomy.

Laboratory Manual of Microbiology for Nurses.

Elizabeth S. Gill, B.S., R.N., Instructor in Nursing, Department of Nursing, College of Physicians and Surgeons, Columbia University, New York; and James T. Culbertson, Ph.D., Professor of Bacteriology and Parasitology, University of Arkansas School of Medicine, Little Rock, Arkansas. 116 pp. \$1.50. G. P. Putnam's Sons, 2 West 45th St., New York City.

This practical laboratory workbook is designed for the student nurse. Charts and data are included with chapters on the following: Use and Care of the Microscope; Staining of Bacteria; Examination of Bacteria for Motility; Preparation of Bacteriological Culture

Media; Inoculation of Culture Media; Cultivation of Bacteria from the Environment and from the Healthy Body; Sterilization, Disinfection and Antisepsis; Staphylococci; Streptococci; Pneumococci; Neisseriae; Enteric Bacteria; Corynebacteria; Mycobacteria; Spore-forming Bacteria; Spirochaetes; Yeasts and Moulds; and Protozoans, Helminths and Arthropods. Each section is followed by exercises and questions for the student. Appendices at the end of the book cover reagents and solutions, and a listing of sources of materials.

Milk and Food Sanitation Practice. H. S. Adams, Chief, Bureau of Environmental Hygiene, Division of Public Health, Minneapolis. 311 pp., illust. \$3.25. The Commonwealth Fund, New York, 1947.

There has been a need for a text in this important field of public health. The Commonwealth Fund has sponsored this book, which in itself is evidence of its merit and in conformity with the Fund's policy it has been made available at a very moderate price. Under "Milk Sanitation" there are chapters dealing with sanitary milk production, undesirable flavours, various aspects of pasteurization, and laboratory procedures used to evaluate a milk supply. Under "Food Sanitation" there is a discussion of personal hygiene of food workers, safety of water supply, protection of food from contamination, from insects, rodents and other animals, and from dangerous chemicals; washing and sterilizing dishes, lighting, ventilation, refrigeration, and toilet and lavatory facilities. Of special interest is a chapter outlining programs of instruction and training of food handlers. An appendix deals with a number of important topics, including physical examination of food for signs of spoilage, food poisonings and infections, suggestions for effecting corrections in the sanitation of food establishments, facts about DDT and its use as an insecticide. The book will serve as a guide to medical officers of health, public health engineers, and sanitarians in problems concerning supervision of milk and food supplies.

The Practical Nurse. Dorothy Deming, R.N., Consultant in Public Health Nursing, Merit System Unit, American Public Health Association. Formerly General Director, National Organization for Public Health Nursing. 370 pp. \$3.00. The Commonwealth Fund, 41 East 57th Street, New York 22, N.Y.

Miss Deming's book on "practical nursing" focuses attention on a field of community health service which may well contain some valuable answers to the current nursing shortage. The review of the history of practical nursing and the services it offered, together with its possibilities for the future, is the result of much study and research on the part of the author. An attempt has been made to place before the reader accurate information on the need and also the supply of practical nurses; the duties of the practical nurse in the hospital; her value in the home; and especially the place she can fill in the care of aged, chronically ill and convalescent patients. With the growth of preventive medicine in industry, another large field for the practical nurse opens up. Schools for the training of practical nurses are a comparatively new development. The author presents a comprehensive survey of the educational facilities now available.

For those concerned with meeting the demand for nursing assistance, and at the same time supporting the trend of professional nurses toward greater specialization, this book offers many practical suggestions.

Radium Dosage. Edited by W. J. Meredith, Christie Hospital and Holt Radium Institute, Manchester. 124 pp., illust. \$3.75. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada Ltd., Toronto, 1947.

The clinical application of the methods described in this book is easily put into practice, even for the radiologist who is not mathematically inclined. The

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explanation for the physical basis of the various methods places the system on a sound footing. The very name "Manchester" is enough to ensure that the material presented is of the highest order and great credit is due to the staff of the Holt Radium Institute for having devised a practical method of radium therapy. All the methods have now been used for a sufficient length of time to prove their value in clinical work. To use the system, whether it be mold, intracavity or interstitial therapy it is necessary to have a variety of radium containers, so that the correct radium distribution is adhered to; although the quantity of radium can be modified slightly in some instances if the proper needles or tubes are not available. The construction of molds requires some degree of patience and skill but is easily mastered. Accurate interstitial radium therapy calls for considerable skill and experience, and as the authors point out, the position of the needles in a radium implant should be checked before the patient leaves the operating room by taking x-ray films. This book is highly recommended to all doctors engaged in the practice of radiotherapy.

Sexual Behaviour in the Human Male. A. C. Kinsey, Professor of Zoology; W. B. Pomeroy, Research Associate; and C. E. Martin, Research Associate, Indiana University. 804 pp., 162 tables. \$7.50. W. B. Saunders Co., Philadelphia and London; McAinsh & Co. Ltd., Toronto, 1948.

The factual data for this book were obtained by direct interviews with about 5,300 white males of widely varied social, educational and religious backgrounds from many regions of the United States. The anonymity of the subjects was so carefully protected that fully detailed histories of sexual experience were obtained. The skilful management of the questions in each interview was such that fraudulent affirmations would be detected. Physical and psychological examinations were not conducted and in those respects all subjects were considered statistically as "normals". Statistical treatment of the data is exhaustive and supported by numerous tables. The authors' text clearly explains the statistics and gives concise interpretations. A spirit of purposefully unbiased scientific judgment pervades the book and the authors refrain from determining right and wrong. They do, however, discuss their conclusions in the light of widely-held social and legal concepts. The factual presentation can give no offense to the cultured mind.

This reviewer selects two conclusions. Firstly, sexual behaviour is influenced from childhood and by the seventeenth year the life pattern is almost completely predetermined. Secondly, usual sexual behaviour is dissimilar in different social groups. To become aware of these dissimilarities, the better to understand or advise his patients, every practising physician should read this book. For similar reasons, clergymen, school teachers, social workers and members of law-enforcing or law-making professions should study it. The conclusions should be applied only to the English speaking white males of North America.

Three Centuries of Canadian Nursing. J. M. Gibbon and M. S. Mathewson, Director of Nursing, the Montreal General Hospital. 505 pp., illust. \$4.00. Macmillan Company of Canada, Toronto, 1947.

It is a large order to deal with so long and fruitful a period as is covered in this book. It requires the combination found in the two authors to handle the material as well as has been done. Perhaps no other country has such a richly varied history of nursing. It is well that the story should be told as a connected whole. Any period one wishes to refer to is interestingly dealt with, and no section of Canada can say that it has been overlooked.

The book in addition to its historical value has the most desirable quality of being readable.

Biological Standardization of the Vitamins. K. H. Coward, Reader in Biochemistry, University of London. 224 pp., illust., 2nd ed. \$4.00. Baillière, Tindall & Cox, London; Macmillan Co. of Canada, 1947.

This second edition of the book deals with the biological methods of determination of vitamins. The first part deals with methods, the second with statistical methods for estimation of the accuracy of results. It is a book of interest to the biochemist worker in the field of biological vitamin assay.

BOOKS RECEIVED

Diseases of the Nose, Throat and Ear. I. S. Hall, Surgeon to the Royal Infirmary, Edinburgh. 463 pp., illust., 4th ed. \$3.75. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada, Toronto, 1948.

Elementary Medical Physics. H. O. Stearns, Associate Professor of Physics, Simmons College. 354 pp., illust. \$4.75. Macmillan Co., New York and Toronto, 1947.

Essentials of Fevers. G. E. Breen, Tempy. Divisional Medical Officer, Hospitals Division, The London County Council. 351 pp., illust., 2nd ed. \$3.75. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada, Toronto, 1948.

Good Health with Diabetes. I. Murray, Physician in Charge of Department for Metabolic Diseases, Victoria Infirmary, Glasgow; and M. B. Muir, Sister-Dietician, Victoria Infirmary, Glasgow. 40 pp. 50c. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada, Toronto, 1947.

Illustrations of Regional Anatomy. E. B. Jamieson, Senior Demonstrator and Lecturer Emeritus, Anatomy Department, University of Edinburgh. 7th ed. Section I: Central Nervous System, \$3.00. Section II: Head and Neck, \$3.75. Section III: Abdomen, \$2.50. Section IV: Pelvis, \$2.15. Section V: Thorax, \$2.00. Section VI: Upper Limb, \$2.50. Section VII: Lower Limb, \$3.00.

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